
**IN THE MATTER OF AN ARBITRATION UNDER
CHAPTER ELEVEN OF THE NORTH AMERICAN FREE TRADE AGREEMENT
AND THE UNCITRAL RULES OF 1976**

-between-

**WILLIAM RALPH CLAYTON, WILLIAM RICHARD CLAYTON, DOUGLAS
CLAYTON, DANIEL CLAYTON AND BILCON OF DELAWARE, INC.**

-and-

GOVERNMENT OF CANADA

**Expert Rejoinder Report of
Darrell B. Chodorow**

6 November 2017

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I. Introduction

1. My name is Darrell B. Chodorow. I am a Principal in the Washington, DC office of The Brattle Group (“Brattle”). I was retained by counsel for the Government of Canada (the “Respondent”) in its dispute with William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton, and Bilcon of Delaware, Inc. (collectively, the “Claimants”).
2. I prepared a report dated 9 June 2017 (**RE-5**, the “Chodorow Report I”) in which I:
 - a. Quantified the historical costs expended by Bilcon of Nova Scotia (“BNS”): (1) as part of the Joint Review Panel (“JRP”) process; and (2) from the date BNS was incorporated until the issuance of the breaching JRP report on 22 October 2007;
 - b. Evaluated the reliability of the discounted cash flow (“DCF”) estimate of lost profits contained in the 13 December 2016 report by Mr. Howard Rosen (the “Rosen Report I”);
 - c. Prepared an alternative DCF valuation of the Whites Point project (“Whites Point” or the “Project”) immediately prior to the 22 October 2007 breach; and
 - d. Estimated the effects of potential mitigation on the lost profits of BNS.
3. On 23 August 2017, the Claimants submitted their Reply Memorial (“Claimants’ Reply Memorial”). The submission was accompanied by the Expert Reply Report of Howard Rosen dated 23 August 2017 (“Rosen Reply Report”) as well as expert reports and witness statements which address topics raised in my first report. The Respondent has asked me to respond.
4. An updated resume is attached as Rejoinder Appendix A. Additional materials considered in the preparation of this report are contained in Rejoinder Appendix B.

II. Summary of Conclusions

5. The Claimants’ reply submissions respond to my analysis of historical amounts spent by BNS on Whites Point and my estimate of BNS’ lost profits on the Project. Based on additional information from the Claimants, and instruction from counsel, I have updated my historical cost analysis. The Claimants’ reply has not changed my fundamental conclusion about Mr. Rosen’s estimate of lost profits. Mr. Rosen’s estimate continues to rely on speculative and unreasonable assumptions, is inconsistent with the Claimants’ own

assessment of the Project at the time, and results in a valuation that is excessive when compared with market benchmarks. As I discuss below, Marsoft Incorporated (“Marsoft”) and SC Market Analytics (“SCMA”) have updated their analyses on which my assessment of lost profits relies. To accommodate these updates, I have prepared an updated DCF analysis of Whites Point as of the breach date and a revised estimate of lost profits.

A. BNS’ HISTORICAL COSTS FOR THE WHITES POINT PROJECT

6. My first report quantified the amounts spent by BNS on Whites Point prior to the breach. In total, records suggest that BNS spent approximately [REDACTED] on the Project from its inception in April 2002 through the October 2007 breach date.¹ Of this amount, [REDACTED] were identified as JRP-related expenses incurred between November 2004, when the JRP was constituted, and the breach date.² The Claimants have not challenged these quantifications.
7. I was also instructed to determine what portion of BNS expenditures were supported with evidence of payment.³ Mr. Paul Buxton states in his Reply Witness Statement that to his knowledge, all invoices were paid.⁴ I am instructed by counsel for the Government of Canada that Mr. Buxton’s statement is deemed sufficient evidence that invoices for his own work were paid, but that it is not sufficient to serve as evidence of payment to others. I have therefore updated my analysis to reflect payment of all of Mr. Buxton’s invoices.
8. The Claimants’ Reply Memorial identified nine instances in which it states there is evidence of payment for amounts that were characterized as unsubstantiated in my analysis.⁵ One instance is [REDACTED] which I now treat as substantiated based on his reply statement. For the remaining eight instances, the confirmation of payment cited by the Claimants, such as [REDACTED] does not justify including them as substantiated.

¹ RE-5, Chodorow Report I, Table 2. These totals in tables from my prior report exclude amounts [REDACTED] which make up the difference between total costs and BNS costs.

² RE-5, Chodorow Report I, Table 1.

³ RE-5, Chodorow Report I, Appendix C, Table C.5.

⁴ Reply Witness Statement of Paul Buxton, 18 August 2017 (“Buxton Reply Statement”), ¶ 68.

⁵ Claimants’ Reply Memorial, ¶¶ 225-227.

9. For one of the nine instances the Claimants' Reply Memorial cites as evidence of payment [REDACTED] [REDACTED].⁶ I do not treat this as substantiation of payment. However, in investigating this instance, I saw that [REDACTED] [REDACTED] I do consider this as substantiation for payment of the prior month's invoice. I searched for other such vendor confirmations of payment, and adjusted my analysis to treat these instances as substantiated.
10. The tally of total BNS costs has not changed, but the portion of those which have been substantiated has increased. The updated results of my analysis are presented below.

Table 1: Updated Estimates of Historical Costs in Canadian Dollars

Date Range	BNS Total Costs	Substantiated Costs
Apr. 2002 - Oct. 2007	[REDACTED]	[REDACTED]
Nov. 2004 - Oct. 2007	[REDACTED]	[REDACTED]

Sources: Table 2 and Table 3.

11. The Claimants state that they have identified other examples of expenses that they believe are substantiated, but have not provided any support for this claim.⁷ If the Claimants provide this support, I will review it and update my analysis as appropriate.

B. MR. ROSEN'S REVISED ESTIMATE OF LOST PROFITS

12. In his first report, Mr. Rosen estimates damages to be US\$298 million before pre-award interest and a gross-up for taxes.⁸ Mr. Rosen's assessment is based on legal instructions to value Whites Point as of 31 December 2016 assuming full expropriation with no chance for mitigation and that the Project would have faced no permitting risk but for the breach. Mr. Rosen's reply agrees with select critiques raised in my first report, causing him to increase his estimate of lost profits to US\$308 million.⁹ Setting aside differences in legal instructions provided by counsel for the Claimants and Respondents, Mr. Rosen continues to rely on assumptions that are speculative, unreasonable, and inconsistent with the

⁶ Claimants' Reply Memorial, ¶ 227h.

⁷ Claimants' Reply Memorial, ¶ 227.

⁸ Expert Report of Howard Rosen, 15 December 2016 ("Rosen Report I"), Figure 2.1.

⁹ Expert Reply Report of Howard Rosen, 23 August 2017 ("Rosen Reply Report"), Figure 2.1.

Claimants' own assessment of the Project. As a result, his assessment of the Claimants' loss is unreliable and excessive compared to market benchmarks even accepting the legal instructions adopted in his report.

1. Mr. Rosen Uses Speculative and Unreasonable Assumptions

13. The Whites Point quarry was never operated or built, and planning and development of the Project ceased at an early stage. The Claimants do not have any reliable contemporaneous economic assessments of Whites Point, such as those that are often used in feasibility or pre-feasibility studies. Nor did the Claimants prepare any contemporaneous forecasts of revenues or costs which might serve as the basis for a DCF analysis. Instead, Mr. Rosen relies on projections of sales volumes, prices, and costs developed specifically for this proceeding. Key aspects of these assumptions are speculative and unreasonable, resulting in an unreliable valuation of Whites Point.

14. *Mr. Rosen's assumed sale prices are too high because he ignores basic economic forces.* The Claimants' reply argues that Whites Point was immune to competition because [REDACTED]. Economic logic dictates that increased supply from Whites Point would have caused prices to fall relative to the actual world. Mr. Rosen also assumes that [REDACTED]. Failure to consider these economic forces causes Mr. Rosen's assumed sale prices for Whites Point aggregates to be excessive, inflating damages.

15. *Mr. Rosen's assumed sale [REDACTED] are inconsistent with [REDACTED]* But for the breach, Mr. Rosen continues to assume [REDACTED].¹⁰ Absent Whites Point, [REDACTED].

¹⁰ Rosen Reply Report, Schedule 2.

¹¹ C-1026, NYSS Confidential Information Memorandum, January 2014, p. 17.

- [REDACTED]
- [REDACTED]
16. *Mr. Rosen's assumed costs are insufficient to produce his assumed product mix.* Mr. Rosen's analysis hinges on assumed operational and marketing plans that are inconsistent with each other. SCMA has conducted an analysis that demonstrates that the cost structure assumed by Mr. Rosen cannot support the product mix that he assumes Whites Point would sell. Achieving Mr. Rosen's assumed sales mix would have resulted in far higher production costs for Whites Point.
 17. *Mr. Rosen assumes a Project that differs from the one described in the Environmental Impact Statement ("EIS").* As discussed in my first report, BNS described its expected operations and sales plan for Whites Point to Canadian regulators in the EIS provided during the JRP process. Mr. Rosen continues to rely on assumptions that differ from those described during JRP process, arguing that Whites Point was not required to adhere strictly to that project description.¹² This is a legal matter on which I cannot opine. However, it is clear that the quarry being valued by Mr. Rosen is operating in ways that are materially different from contemporaneous expectations and that lead to increased damages.
 18. Mr. Rosen's use of these speculative, unreasonable, and inconsistent assumptions results in an unreliable assessment of damages.

2. Independent Benchmarks Suggest Mr. Rosen's Valuation Is Excessive

19. Given that Whites Point never operated, was at an early stage of development, and lacked contemporaneous reliable economic assessments, it is important to test the reasonableness of Mr. Rosen's valuation. Mr. Rosen has not conducted any such tests to demonstrate that his findings are reasonable. However, an analysis of independent benchmarks suggests that Mr. Rosen's valuation is excessive.
20. One benchmark that can be used to assess the reasonableness of Mr. Rosen's results is profit margin. Mr. Rosen's valuation implies that Whites Point would have earned gross profit margins in excess of [REDACTED]. These implied margins are consistently [REDACTED] those earned by the publicly traded aggregates producers.

¹² See, for example, Expert Reply Report of GHD Limited (Peter Oram), 17 August 2017 ("Oram Reply Report"), p. 1.

21. Mr. Rosen speculates that profit margins for Whites Point should be higher than those of Vulcan and Martin Marietta for a variety of reasons. However, he has not analyzed any of these factors to determine whether they would justify Whites Point margins that are more than double those of publicly traded companies. One factor Mr. Rosen assumes would lead to higher profitability at Whites Point is private ownership. [REDACTED]
[REDACTED]
[REDACTED]
22. A second benchmark that can be used to evaluate Mr. Rosen's valuation is indications of market value from actual or proposed transactions of Whites Point, as described in my first report. One reason that Mr. Rosen dismisses these market value indications is because he states that this type of valuation indicates the general view of the market on the Project's value, not the Claimants' specific perspective. Mr. Rosen states that the Claimants' ability to vertically integrate Whites Point into the Claytons' larger business made it more valuable. However, other potential buyers, [REDACTED], also would have been able to vertically integrate Whites Point into their larger construction materials and aggregates businesses, and the Claimants do not demonstrate or quantify any unique synergies from vertical integration. Thus, there is no basis to believe that Whites Point was more valuable to BNS than to other potential owners.
23. Mr. Rosen also objects to the market value indicators because the observations are from dates prior to his valuation date. I recognized this concern in my first report, and used the returns from an index of publicly traded aggregates producers to move the market value indicators to Mr. Rosen's valuation date. Mr. Rosen claims that my use of this indexation approach is unreasonable. However, indexation is a widely accepted economic method to estimate the change in value of an asset between two dates.
24. While Mr. Rosen values Whites Point at US\$308 million, the market value indicators indexed to Mr. Rosen's valuation date are [REDACTED] (based on the indexed [REDACTED] offer value) or less. Thus, Mr. Rosen's valuation implies that the Claimants' investment in Whites Point would have grown in value at a rate of at least [REDACTED] times that of an investment in publicly traded aggregates producers over the same time period. However, Mr. Rosen provides no analysis demonstrating that such outperformance is reasonable.

C. THE VALUE OF WHITES POINT IMMEDIATELY PRIOR TO THE BREACH

25. Counsel for the Respondent asked me to prepare an alternative DCF analysis of Whites Point. I was instructed that this valuation should reflect the value of Whites Point

immediately prior to the breach and should assume that at the time Whites Point was subject to permitting risk even absent the breach. This valuation, however, does not reflect my opinion on the damages to the Claimants resulting from the breach because it does not account for the Claimants' ability to mitigate the effects of the breach.

26. After my review of the Claimants' Reply Memorial, expert reports, and witness statements, as well as the Marsoft and SCMA rejoinder reports, I adjust my valuation of Whites Point immediately prior to the breach to account for Marsoft's revised freight cost forecasts and SCMA's adjustment of marine terminal maintenance costs.
27. As a result of these adjustments, the present value of profits from Whites Point as of the breach date is US\$6.3 million before accounting for permitting risks.¹³ I was instructed that there were many alternative outcomes in which Whites Point would have been unable to receive the approvals or permits that were necessary to operate. I am unable to independently assess the probability with which Whites Point would have received all necessary approvals and permits. The chance that Whites Point would have failed to operate absent the breach reduces its value and could be accounted for using the methodology that I describe in my first report.

D. THE ECONOMIC LOSS TO THE CLAIMANTS FROM THE BREACH

28. I was instructed that in assessing the Claimants' loss resulting from the breach that it is legally appropriate to determine that loss as of the breach date rather than the award date, as assumed by Mr. Rosen. As a matter of economics, assessing the loss as of the breach date is an economically efficient standard because it would make the Claimants whole as of the breach date. In contrast, Mr. Rosen's use of an ex-post damages approach fails to recognize that while the Claimants may have lost profits as a result of the breach, they were also relieved of the risk associated with the Project.
29. As I described in my first report, Mr. Rosen calculates expropriation-style damages that ignore any potential mitigation available through the Canadian judicial review process, which I am instructed was available to the Claimants. In response, Mr. Rosen received a new instruction from counsel that this form of mitigation should not be considered. I am instructed that the Claimants' legal position is incorrect.

¹³ This is discussed in Section VII.

30. Mitigation is a fundamental aspect of an economically sound quantification of economic damages. In the case of Whites Point, the Claimants could have pursued the judicial review process to counter the effects of the breach. Moreover, pursuit of judicial review would have been logical if one accepts the Claimants' assertions that Whites Point was worth in excess of US\$300 million and the Project was strategically important to their other business interests. Given these assertions, the economic cost of mitigation through judicial review was low relative to the claimed value of Whites Point and judicial review would have allowed the Claimants to continue pursuing a project that they viewed as having significant value and strategic importance.
31. As discussed in my first report, mitigation would involve additional procedural costs and would have delayed the start of the Project. I have reassessed my estimate of economic loss to the Claimants accounting for mitigation based on the revised projection of freight costs from Marsoft and the adjusted maintenance costs from SCMA as noted above. Consistent with my first report, I estimate the economic loss to BNS from the breach to be US\$1.15 million after accounting for mitigation.

III. Evaluation of BNS' Historical Costs

32. In my initial report, I was asked to prepare two quantifications of historical expenditures by BNS on the Project. The first tabulated BNS' historical costs for the JRP process defined as costs incurred from 3 November 2004 through 22 October 2007, the period from when the JRP was constituted until the breach date.¹⁴ The second included all BNS costs in developing the Project from 24 April 2002 through 22 October 2007, the period from when BNS was formed through the breach date.¹⁵ For both quantifications, I provided an estimate of total costs and an estimate of the portion of those total costs for which I was able to identify evidence of payment. Based on discussions with Respondent's counsel I included as evidence of payments items such as payment receipts, cashed checks, and statements of electronic fund transfers.
33. I also was asked to review the Claimants' "Net Damages" calculation, presented by Mr. Buxton, which quantifies the amount the Claimants spent on Whites Point. As noted in my initial report, Mr. Buxton's calculation lacked support tying it back to the 150 exhibits

¹⁴ RE-5, Chodorow Report I, ¶ 46a.

¹⁵ RE-5, Chodorow Report I, ¶ 46b.

that Claimants state are the basis for the claimed expenditures.¹⁶ Mr. Buxton states in reply

[REDACTED]
[REDACTED].¹⁷ Regardless of the terminology, the Claimants still have not provided the backup spreadsheet for Mr. Buxton's calculations. Therefore, I remain unable to assess fully his analysis or to identify the basis for the relatively minor differences between my estimate of historical costs and Mr. Buxton's calculation.

34. The Claimants identify nine instances where they believe my analysis failed to identify evidence of payment.¹⁸ As I discuss below, I do not agree with the Claimants. My estimate of total BNS historical costs remains unchanged. However, I have updated my analysis of payment substantiation based in part on new information in the Buxton Reply Statement.

A. THE CLAIMANTS HAVE NOT FULLY SUBSTANTIATED BNS' HISTORICAL COSTS

35. As noted in my initial report, I was instructed that the Claimants are obligated to provide affirmative evidence that payments were made for any claimed expense. To assess and tabulate the payments made in the development of Whites Point and in the JRP process, the Claimants were asked to provide support for all costs and payments underlying Mr. Buxton's Net Damages calculation. In response, the Claimants produced a set of 150 bi-weekly expense summaries, each with a variety of supporting documents attached including handwritten summaries, copies of receipts, invoices, letters to BNS, and a variety of other materials.¹⁹ The Claimants did not produce any backup spreadsheets supporting Mr. Buxton's calculation or instructions on interpreting the materials. Based on the information provided, I sought to determine which of the approximately 3,000 cost items included in the summaries could be matched with evidence of payment in the attached supporting materials.
36. Mr. Buxton states that to his knowledge, all invoices were paid.²⁰ I am instructed by counsel for the Respondent that Mr. Buxton's statement is not sufficient to serve as

¹⁶ RE-5, Chodorow Report I, ¶¶ 48 and 55.

¹⁷ Buxton Reply Statement, ¶ 66.

¹⁸ Claimants' Reply Memorial, ¶ 227.

¹⁹ Exhibits C-1169 through C-1318; and RE-5, Chodorow Report I, Appendix C, Table C.5.

²⁰ Buxton Reply Statement, ¶ 68.

evidence of payment for expenses other than his own invoices. Accordingly, I continue to base my assessment on clear documentary evidence of payment in the record for costs other than payments to Mr. Buxton.

37. The Claimants' Reply Memorial also states that they have provided payment substantiation for certain costs which are characterized in my analysis as unsubstantiated.²¹ Out of the 2,947 expenses listed in my first report, I identified substantiation for 894 expenses.²² The Claimants list nine additional instances that they state are substantiated by the 150 exhibits accompanying Mr. Buxton's first witness statement.²³
38. I have reviewed each of the nine instances identified by the Claimants. In six of their claimed errors, the Claimants appear to cite as evidence of payment [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED].²⁴ Based on an instruction from counsel, I do not view such handwritten notes of this nature as evidence of payment.²⁵ Figure 1 provides an example of the handwritten notes the Claimants cite as evidence of payment.²⁶

²¹ Claimants' Reply Memorial, ¶¶ 225-227.

²² RE-5, Chodorow Report I, Appendix C, Table C.5.

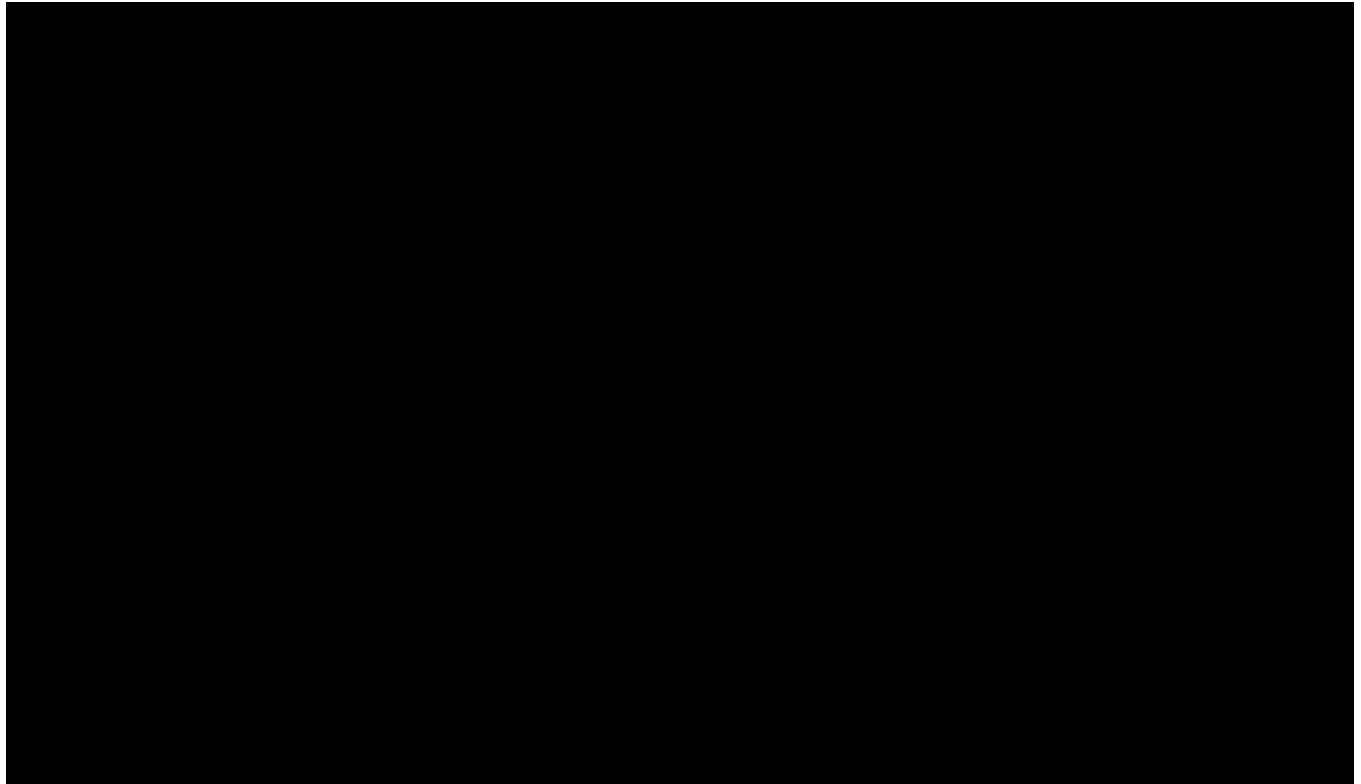
²³ Claimants' Reply Memorial, ¶ 227.

²⁴ These include examples cited in the Claimants' Reply Memorial, ¶ 227b, d, e, f, g, and i. See RE-5, Chodorow Report I, Appendix C, Table C.5.

²⁵ Several of these cost items required combining values from multiple invoices, less tax to match a single cost line item on the corresponding bi-weekly summary, which highlights the difficulty of assessing the Claimants' produced materials.

²⁶ Claimants' Reply Memorial, ¶ 227.

Figure 1: Invoice from C-1306



39. In another instance, the Claimants argue that I disregard evidence of payments [REDACTED]. This period is beyond the October 2007 breach date, and was therefore intentionally excluded based on my legal instruction about the relevant period from counsel. Another example [REDACTED].²⁸ Based on the Buxton Reply Statement, I now accept as substantiated [REDACTED].
40. The final instance pertains to [REDACTED].²⁹ As with the other handwritten phrases, I do not treat this alone as confirmation of payment of [REDACTED] referenced in the Claimants' Reply Memorial.³⁰ While this document does not support that [REDACTED].

²⁷ Claimants' Reply Memorial, ¶ 227c.

²⁸ Claimants' Reply Memorial, ¶ 227a.

²⁹ Claimants' Reply Memorial, ¶ 227h.

³⁰ Exhibits **C-1169** through **C-1318**; and **RE-5**, Chodorow Report I, Appendix C, Table C.5.

[REDACTED] I view this as a reasonable source of confirmation that [REDACTED] has been paid. I have searched for other such [REDACTED], and have identified other amounts that I treat as confirmed payments.

41. I have revised the results of my prior analysis to reflect the adjustments for payment substantiation in Table 2 and Table 3. The total costs (which include [REDACTED] [REDACTED]) and the costs invoiced to BNS have not changed.

**Table 2: Total Historical Costs in Canadian Dollars
(Apr. 2002 – Oct. 2007)**

	Total Costs	BNS Total Costs	Substantiated Costs
[1] Consulting Experts	[REDACTED]	[REDACTED]	[REDACTED]
[2] Panel Costs	[REDACTED]	[REDACTED]	[REDACTED]
[3] Office & Operations	[REDACTED]	[REDACTED]	[REDACTED]
[4] 2004 GQP Purchase	[REDACTED]	[REDACTED]	[REDACTED]
[5] Total Investment Costs	[REDACTED]	[REDACTED]	[REDACTED]

Source: Chodorow Rejoinder Appendix C, Table C.1.

Notes: Substantiated Costs exclude costs that were not deemed to have evidence of payment or where [REDACTED] [REDACTED]. Figures reported in US\$ are converted to C\$ using the month-end exchange rate for each invoice.

[1]: Costs associated with consulting experts for the environmental assessment.

[2]: Costs associated with the JRP Panel. This includes all payments to the Canadian Environmental Assessment Agency and the Nova Scotia Department of the Environment and Labour.

[3]: Costs associated with the development of the quarry and business, excluding foreign withholding taxes.

[4]: Claimants' payments to buy Nova Stone Exporters stake in GQP, converted to Canadian dollars.

[5]: [1] + [2] + [3] + [4].

**Table 3: JRP-Related Costs in Canadian Dollars
(Nov. 2004 – Oct. 2007)**

	Total Costs	BNS Total Costs	Substantiated Costs
[1] Consulting Experts	██████████	██████████	██████████
[2] Panel Costs	██████████	██████████	██████████
[3] Office & Operations	██████████	██████████	██████████
[4] Total Investment Cost	██████████	██████████	██████████

Source: Chodorow Rejoinder Appendix C, Table C.2.

Notes: Substantiated Costs exclude costs that were not deemed to have evidence of payment or where ██████████ ██████████. Figures reported in US\$ are converted to C\$ using the month-end exchange rate for each invoice.

[1]: Costs associated with consulting experts for the environmental assessment.

[2]: Costs associated with the JRP Panel. This includes all payments to the Canadian Environmental Assessment Agency and the Nova Scotia Department of the Environment and Labour.

[3]: Costs associated with the development of the quarry and business, excluding foreign withholding taxes.

[4]: [1] + [2] + [3].

42. The Claimants suggest that ██████████ ██████████ ██████████ ██████████ beyond their nine examples, but have not provided any detail.³¹ If the Claimants identify additional instances of expenses they believe are substantiated with evidence of payment, I will review them and update my analysis as appropriate.

B. THE CLAIMANTS DO NOT DISPUTE MY OVERALL QUANTIFICATION OF COSTS

43. Apart from the substantiation of certain payments listed on invoices, the Claimants do not dispute my overall quantification of costs or the separation of those costs billed to BNS and the Claimants from ██████████. I made this segregation of costs because I have been instructed that entities other than the Claimants are ineligible for damages. While Mr. Buxton has not provided support for his computation of Net Damages, my overall measure of historical costs is relatively consistent with his figure.
44. In my first report, counsel for the Government of Canada instructed me to define JRP-related costs as those incurred from 3 November 2004, when the JRP was constituted, through 22 October 2007, when the JRP issued its report.³² Mr. Buxton states that Investors were fully engaged in an environmental assessment process from May 2002 until

³¹ Claimants' Reply Memorial, ¶ 227.

³² RE-5, Chodorow Report I, ¶ 46a.

17 December 2007.³³ Counsel for the Government of Canada has asked me to continue using the instruction from my first report to identify JRP-related costs.

IV. Mr. Rosen Uses Speculative and Unreasonable Assumptions in His Valuation of Whites Point

45. The Whites Point quarry never operated, the facilities were never constructed, and progress of the Project ceased at an early stage of development. The Claimants have not been able to identify any contemporaneous economic analysis which might serve as the basis for a DCF analysis of the Project, such as those commonly undertaken for mining feasibility or pre-feasibility studies. Nor have they identified any contemporaneous forecasts of Project revenues or costs.³⁴ Mr. Rosen's analysis is therefore based on assumptions regarding customers, sales volumes, product mix, construction costs, and operating costs developed specifically for this proceeding.
46. Mr. Rosen was instructed to value Whites Point as of 31 December 2016 (including any profits that would have been generated up to that date) assuming full expropriation with no chance for mitigation.³⁵ Even accepting these instructions, key assumptions used by Mr. Rosen to conduct this exercise are speculative, unreasonable, and inconsistent with the Claimants' own expectations for the Whites Point project prior to the breach.

A. MR. ROSEN DOES NOT ACCOUNT FOR PERMITTING RISK

47. Mr. Rosen was instructed to assume that, but for the breaching JRP report, Whites Point would have operated with certainty.³⁶ Implicit in Mr. Rosen's approach is the assumption that, absent the breach, Whites Point faced no risk in obtaining all necessary approvals and permits to operate. I referred to this as "permitting risk" in my first report.³⁷ If there was uncertainty about whether Whites Point would have received all of the necessary

³³ Buxton Reply Statement, ¶ 70.

³⁴ The Claimants were asked to provide any such forecasts in **R-720**, Document Production Request of the Government of Canada, 10, February 2016, Document Request Number 7 and 8 and were not able to provide any such forecasts.

³⁵ Rosen Reply Report, ¶¶ 2.3 and 3.17.

³⁶ Rosen Reply Report, ¶ 3.35.

³⁷ **RE-5**, Chodorow Report I, ¶¶ 159 and 190.

approvals and permits to operate without the breach, Mr. Rosen has overstated the value of Whites Point by ignoring this risk.

48. I was instructed by the Respondent's counsel that Mr. Rosen's assumption of no permitting risk is unreasonable. It is my understanding that the Claimants ignore multiple plausible scenarios under which Whites Point may have failed to receive all approvals and/or permits to operate absent the breach, as described below.
49. **A negative JRP recommendation would have been possible, even absent the breach.** Ms. Griffiths opines that the JRP could have reasonably concluded that the Project would have resulted in significant adverse environmental effects on the North Atlantic Right Whale and the American Lobster.³⁸ Ms. Griffiths concludes that there is a "solid factual basis" upon which the JRP could have decided the claimed benefits of the Project did not justify these environmental harms and recommended against approval of the Project.³⁹ Thus, absent the breach, BNS still may have received an unfavorable JRP report.
50. In his first report, Mr. Blouin opines that "[u]nder the Nova Scotia EA regime, the environmental effects of similar types of projects may vary depending on the location, size, and nature of proposed activities, as well as other specific factors relating to the project and its surrounding area," an opinion he reiterates in his rejoinder report.⁴⁰ Mr. Blouin also finds that other factors, such as concerns from the public, must be considered by the JRP.⁴¹ Due to the interaction of multiple factors, Mr. Blouin states that it is not possible to predict reliably the decision of the JRP for Whites Point absent the breach.⁴² However, Mr. Blouin concludes that the JRP had "adequate justification" to recommend against the approval of the Whites Point project absent the breach.⁴³
51. **Rejection of the Project by the Nova Scotia Government or the Canadian Government would have been possible even with a positive JRP recommendation.** Mr. Geddes and Mr.

³⁸ RE-1, Expert Report of Lesley Griffiths, 9 June 2017 ("Griffiths Report I"), ¶ 64; and RE-9, Expert Rejoinder Report of Lesley Griffiths, 6 November 2017, ("Griffiths Rejoinder Report"), ¶ 5.

³⁹ RE-1, Griffiths Report I, ¶ 154; and RE-9, Griffiths Rejoinder Report, ¶¶ 5 and 85.

⁴⁰ RE-2, Expert Report of Tony Blouin, 9 June 2017 ("Blouin Report I"), ¶ 38; and RE-10, Expert Rejoinder Report of Tony Blouin, 6 November 2017 ("Blouin Rejoinder Report"), ¶ 2.

⁴¹ RE-2, Blouin Report I, ¶¶ 18 and 39; and RE-10, Blouin Rejoinder Report, ¶ 85.

⁴² RE-2, Blouin Report I, ¶ 120; and RE-10, Blouin Rejoinder Report, ¶¶ 82-83.

⁴³ RE-10, Blouin Rejoinder Report, ¶ 83.

Connelly testify that refusal by the provincial or federal governments to grant the Whites Point project approval was a reasonable possibility.⁴⁴ Mr. Geddes specifies, for example, that “even where a joint review panel is established, responsibility for approving or rejecting an undertaking for the Province rests with the Minister” and the undertaking can be rejected.⁴⁵ Mr. Geddes also mentions that the Minister of Environment and Labour of Nova Scotia, in the case of Whites Point, “was well aware of the concerns surrounding the socio-economic effects of the project because of the numerous letters and submissions received from citizens, municipalities and other stakeholders” and “[t]hese concerns are factors that he could have considered in his decision, whether or not they were addressed by the JRP.”⁴⁶ Likewise, Mr. Connelly identifies a number of factors that would have been considered under the Federal Government’s duties in rendering its decision beyond the JRP report, such as comments from the public and the opposition of regional stakeholders like the Bear River First Nation.⁴⁷

52. **Approval would not guarantee the granting of permits.** Even if Whites Point were granted approvals, Mr. Connelly finds that the Project was subject to the risk of not obtaining required permits under both the *Fisheries Act* and the *Navigable Waters Protection Act*, or that it might only obtain them at a cost that could render the project economically non-viable.⁴⁸
53. Figure 2, below, illustrates the potential outcomes identified by the Respondent’s experts for Whites Point depending on the approval or rejection of the various decision making bodies. Mr. Rosen’s analysis assumes only one course of action absent the breach, ignoring all other possibilities.

⁴⁴ **RE-4**, Report of Peter Geddes, 9 June 2017 (“Geddes Report I”), ¶ 25; **RE-3**, Expert Report of Robert G. Connelly, 9 June 2017 (“Connelly Report I”), ¶ 101; and **RE-11**, Expert Rejoinder Report of Robert G. Connelly, 6 November 2017 (“Connelly Rejoinder Report”), ¶ 56.

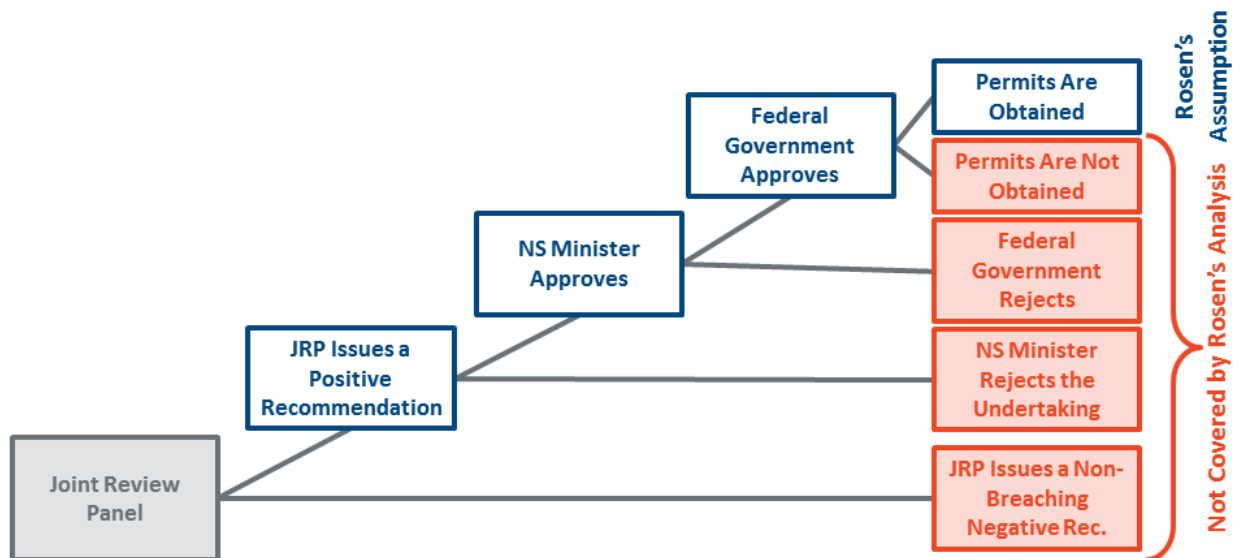
⁴⁵ **RE-4**, Geddes Report I, ¶¶ 12-13.

⁴⁶ **RE-4**, Geddes Report I, ¶ 25.

⁴⁷ **RE-3**, Connelly Report I, ¶¶ 85 and 101; and **RE-11**, Connelly Rejoinder Report, ¶¶ 29 and 56.

⁴⁸ **RE-3**, Connelly Report I, ¶ 27; and **RE-11**, Connelly Rejoinder Report, ¶¶ 17, 50, and Appendix I. *See also RE-3*, Connelly Report I ¶ 77: “If the GIC approves the decision that the significant adverse environmental effects of the project are justified in the circumstances, the Responsible Authority may exercise any power or perform any duty or function that would permit the project to proceed (s. 37(1)(a)). The use of the discretionary term ‘may’ confirms that further information and details at this stage could still prevent the project from proceeding.”

Figure 2: Possible Whites Point Approval and Permitting Outcomes Absent the Breach



Note: I understand that the Nova Scotia and Federal Government decisions occur concurrently.

54. ██████ offer to buy Whites Point for ██████ in ██████ recognized the concern over approvals and permitting risk.⁴⁹ ██████
 ██████, which implies that ██████
 ██████
55. In sum, Mr. Rosen's damages estimate assumes that Whites Point would have been approved and permitted with certainty. I understand that there are many alternative plausible outcomes in which Whites Point would have been unable to receive the approvals or permits that were necessary to operate. The chance that Whites Point would have failed to operate absent the breach reduces its fair market value. As such, Mr. Rosen's analysis overstates damages resulting from the breach. I do not have an opinion on the magnitude of approval and permitting risk, but my first report explains how the value of Whites Point would be affected by different levels of such risk.⁵⁰

B. MR. ROSEN ASSUMES PRICES THAT ARE SPECULATIVE AND UNREASONABLE

56. A critical input driving Mr. Rosen's valuation is the price that Whites Point would have received for its aggregates. For 2011 to 2015, Mr. Rosen assumes that ██████
 ██████

⁴⁹ R-590, Letter from Tom Hill, ██████ to William Clayton, ██████.

⁵⁰ RE-5, Chodorow Report I, ¶ 26 and Figure 15.

[REDACTED].⁵⁷ [REDACTED] referred to by Mr. Dooley is his claim that [REDACTED].
[REDACTED] As a result, Mr. Dooley states that Whites Point faced no competition from other offshore quarries because they [REDACTED].
[REDACTED]⁵⁸ Similarly, Mr. Wick claims that [REDACTED].
[REDACTED]
[REDACTED]⁵⁹ Citing to the opinions of Mr. Dooley and Mr. Wick, Mr. Rosen states that “I believe Mr. Chodorow oversimplifies the aggregate market and the associated prices without contemporaneous evidence or analysis.”⁶⁰ In short, the Claimants’ experts argue that [REDACTED].
[REDACTED]

60. Mr. Rosen and the Claimants’ other experts make a critical error. They confuse the prices that [REDACTED].
[REDACTED] According to Messrs. Dooley and Wick, the claimed [REDACTED].⁶¹ [REDACTED].
[REDACTED]
[REDACTED]
[REDACTED]⁶² [REDACTED].
[REDACTED].⁶³

⁵⁷ Reply Witness Statement of Tom Dooley, 18 August 2017 (“Dooley Reply Statement”), ¶ 11.

⁵⁸ Dooley Reply Statement, ¶¶ 6 and 10.

⁵⁹ Expert Reply Report of John T. Boyd Company (Michael Wick), August 16, 2017 (“Wick Reply Report”), ¶ 38. Emphasis in original.

⁶⁰ Rosen Reply Report, ¶ 5.23.

⁶¹ Wick Reply Report, ¶¶ 2 and 54; and Dooley Reply Statement, ¶¶ 5-7.

⁶² SCMA has concluded that [REDACTED]. **RE-16**, Expert Rejoinder Report of SC Market Analytics, 6 November 2017 (“SCMA Rejoinder Report”), ¶¶ 7-8.

⁶³ SCMA reached this same conclusion. **RE-16**, SCMA Rejoinder Report, ¶ 6.

2. Whites Point Would Have Faced Competition from Existing and Potential Aggregates Producers

61. [REDACTED], as demonstrated by the fact that it had [REDACTED]. If [REDACTED] were maximizing its own profits, [REDACTED]. The incentives for [REDACTED] to obtain the best price were reinforced by the different ownership interests in [REDACTED]. Whites Point was wholly owned by BNS, which was owned by the Claimants. In contrast, N [REDACTED]. [REDACTED]. If [REDACTED] had attempted to buy aggregates from Whites Point at a price [REDACTED]. [REDACTED]. [REDACTED]. [REDACTED]. [REDACTED].⁶⁵

62. Competition with other potential aggregates quarries⁶⁶ would have resulted in lower prices for Whites Point in the but-for world, as indicated by the basic supply and demand analysis in my first report.⁶⁷ While Mr. Wick argues that [REDACTED],⁶⁸ this assertion is contradicted by the Claimants' own witnesses. These witnesses highlight the presence of [REDACTED].

a. Mr. Dooley recognizes that [REDACTED]. [REDACTED]. [REDACTED].

⁶⁴ Witness Statement of Joe Forestieri, 13 December 2016 ("Forestieri Witness Statement"), ¶¶ 14-16.

⁶⁵ [REDACTED]
[REDACTED] C-1050, Amboy Aggregates Joint Venture Agreement, Section 4.2, p. 12.

⁶⁶ I discuss some potential entrants in RE-5, Chodorow Report I, ¶¶ 141-142.

⁶⁷ RE-5, Chodorow Report I, ¶¶ 133, 135, and 136.

⁶⁸ Wick Reply Report, ¶ 57. Emphasis in original.

[REDACTED]⁶⁹ A decision to buy from Whites Point would not eliminate the competitive threat from these or other potential suppliers.

- b. Mr. Dooley states of the [REDACTED]
[REDACTED].⁷⁰ As a result, [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] ■ [REDACTED]
[REDACTED]
[REDACTED] ■
- c. Mr. Fougere recognizes the risk of competition from added aggregates output in the region, stating that [REDACTED]
[REDACTED]⁷³
Similarly, Mr. Fougere recognizes that Whites Point would have been [REDACTED]
[REDACTED]
[REDACTED].⁷⁴
- d. Mr. Lizak speculates that “Vulcan may not have pursued the Black Point project had Canada approved Bilcon’s Whites Point quarry venture.”⁷⁵ His statement recognizes the economic reality that Black Point and Whites Point would have been in competition with each other.

63. SCMA also recognizes that other existing and new quarries would provide price competition to Whites Point.⁷⁶ It is clear other aggregates suppliers were interested in selling [REDACTED] and that they were willing to compete aggressively. The construction of

⁶⁹ Dooley Reply Statement, ¶ 16.

⁷⁰ Dooley Witness Statement, ¶ 80. Emphasis added.

⁷¹ Dooley Witness Statement, ¶ 81.

⁷² Dooley Witness Statement, ¶ 80.

⁷³ Reply Witness Statement of Dan Fougere, 18 August 2017 (“Fougere Reply Statement”), ¶ 17.

⁷⁴ Fougere Reply Statement, ¶ 13.

⁷⁵ Expert Reply Report of Mineral Valuation & Capital, Inc. (John Lizak), 8 August 2017 (“Lizak Reply Report”), p. 18.

⁷⁶ RE-16, SCMA Rejoinder Report, ¶ 6.

Whites Point would have resulted in a market with greater competition to supply aggregates [REDACTED], and therefore lower prices than existed in the actual world. A damages analysis should reflect those lower but-for prices. The failure of Mr. Rosen to account for any price reduction means his value for Whites Point is overstated.

3. Mr. Lizak Highlights that Whites Point Could Have Materially Impacted Market Prices for Aggregates from Nova Scotia

64. Mr. Wick states that because the entire U.S. market for aggregates is very large and Whites Point is small [REDACTED].⁷⁷ This claim is devoid of any market analysis because it does not consider the supply and demand dynamics in the specific markets that might be economically served by Whites Point and other potential new quarries.⁷⁸
65. Importantly, Mr. Wick's assertion is contradicted by Mr. Lizak who states that:
- Interestingly, Vulcan did not announce its decision to undertake the Black Point venture until after Canada rejected Bilcon's venture. SC does not consider that Vulcan may not have pursued the Black Point project had Canada approved Bilcon's Whites Point quarry venture.⁷⁹
66. Mr. Lizak's statement supports my fundamental concern with Mr. Rosen's assumed prices. If Whites Point had been built, Mr. Lizak recognizes that this would have changed the supply-demand balance relative to the actual world, reducing prices. The lower prices would have adversely affected the value of the Black Point project. In Mr. Lizak's view, the price reduction resulting from Whites Point could have been large enough to cause Vulcan to abandon the Black Point project altogether. Thus, Mr. Lizak contradicts Mr. Wick's unsupported opinion that Whites Point [REDACTED] [REDACTED].⁸⁰ Since Whites Point would be subject to competitive market prices, any reduction in prices created by the addition of Whites Point as a new supplier should be accounted for in its valuation, yet Mr. Rosen's prices do not consider any such effect.
67. I also note that Mr. Wick misunderstands the economic concept underlying my conclusion that but-for prices would have been lower than actual market prices. Mr. Wick claims that

⁷⁷ Wick Reply Report, ¶ 56.

⁷⁸ RE-16, SCMA Rejoinder Report, ¶ 37.

⁷⁹ Lizak Reply Report, p. 18.

⁸⁰ Wick Reply Report, ¶ 56.

“[t]he Brattle Report builds on the unsupported SCMA opinions by supporting the decline-in-pricing-theory with misapplied supply side economics.”⁸¹ The analysis presented in my first report, which shows that price is a function of supply and demand is the basic equilibrium price model, not supply-side economics.⁸² Supply-side economics refers to the relationship between income tax rates and economic output which has been used to argue that reducing tax rates will spur economic growth resulting in an overall increase in tax revenue (referred to by some as “voodoo economics”).

4. Mr. Rosen Assumes Unreasonable Prices Beyond 2015

68. Mr. Rosen assumes that prices from 2016 to 2060 would be equal to his assumed 2015 price plus inflation. Mr. Rosen concludes that this approach is reasonable because of: (1) historical growth in aggregates prices; and (2) evidence from Messrs. Dooley and Wick regarding expected demand for aggregates.⁸³ This assumption is unreasonable.
69. First, the 2015 price which Mr. Rosen uses as the anchor for his long-term price forecast is too high because it fails to consider the effects of competition, as discussed above.
70. Second, historical aggregates prices *have not* kept up with inflation. Mr. Rosen stated that his assumption that prices would grow with inflation from 2016 to 2060 is “reasonable based on the historical growth in aggregates prices,” which he believes provides “some historical precedent for real price growth.”⁸⁴ Real price growth would mean prices rise faster than inflation. Mr. Lizak states that aggregates prices have historically grown faster than inflation based on data from the U.S. Geological Survey (“USGS”):

The average annual price of crushed stone is shown on Figure 2 (USGS). Crushed stone sales in the United States increased at an average rate of roughly 4.0% per year from 1950 to 2000. Nominal prices increased at an average rate of approximately 3.0% per year during the same period.⁸⁵

71. In fact, the exact opposite is true. Figure 3 recreates the figure from Mr. Lizak’s report, but shows the USGS-reported crushed stone prices in real dollars, which the USGS presents on

⁸¹ Wick Reply Report, ¶ 58. Emphasis added.

⁸² RE-5, Chodorow Report I, ¶ 133 and Figure 11.

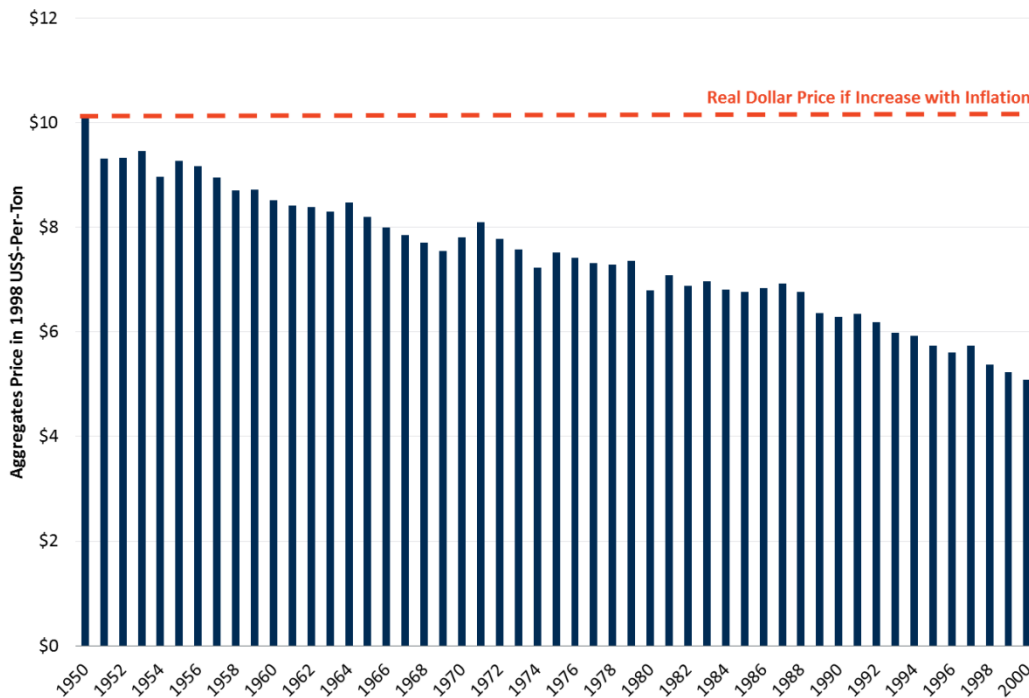
⁸³ Rosen Report I, ¶ 5.20. Mr. Rosen cites to Mr. Boyd, but he appears to be referring to Mr. Wick of John T. Boyd Company.

⁸⁴ Rosen Report I, ¶¶ 5.19-5.20.

⁸⁵ Expert Report of Mineral Valuation & Capital, Inc. (John Lizak), 30 November 2016, pp. 14-15.

the same source table. Prices increasing with inflation would appear as a flat line at US\$10.10-per-ton, and prices increasing faster than inflation would appear as an upward sloping line. The actual USGS data show that real prices in constant 1998 U.S. dollars for crushed stone reported directly by the USGS dropped by approximately 50% over the period cited by Mr. Lizak from US\$10.10-per-ton in 1950 to US\$5.08 in 2000.⁸⁶ The decline in the real dollar prices shows that prices for crushed stone were increasing at a rate below inflation over the long term. While prices increased in real terms after 2000, the 2014 price in real terms of US\$6.99 remained far below the 1950 price of US\$10.10.⁸⁷ Thus, over the long-term, crushed stone prices in the U.S. increased at a rate that is *below* inflation.

**Figure 3: USGS Aggregates Prices Reported in 1998 US\$-per-Ton
1950 - 2000**



Sources: **C-1152**, Stone (Crushed) Statistics, U.S. Geological Survey (1900-2014), 28 January 2016; Chodorow Rejoinder Appendix F, Table F.10.

⁸⁶ **C-1152**, Stone (Crushed) Statistics, U.S. Geological Survey (1900-2014), 28 January 2016.

⁸⁷ **C-1152**, Stone (Crushed) Statistics, U.S. Geological Survey (1900-2014), 28 January 2016. The USGS reported these figures in 1998 U.S. dollars.

72. Third, while Mr. Rosen cites to expected growth in demand for aggregates,⁸⁸ this is only half of the equation. Future prices are a function of both demand and supply. For example, natural gas demand has increased materially in the U.S. since 2008. Despite increased demand, prices have fallen significantly because supply capacity has also increased.⁸⁹
73. The USGS data cited by Mr. Lizak show that prices have increased in real dollar terms over the last decade.⁹⁰ Price increases for this same time period were reported by Mr. Wick for New York City as well.⁹¹ Indeed, the prices that Mr. Rosen assumes Whites Point would have received [REDACTED]
[REDACTED]⁹² Imbalances between supply and demand can cause such material increases in real prices. But the effects are often temporary. When imbalances spur price increases, profit margins also generally increase. Increased profit margins induce entry from new sources of supply, which typically cause prices and profit margins to decline as additional supply becomes available:

Under long-run conditions, average cost will tend to be just equal to price and all excessive profits will be eliminated. If price exceeds average costs, more firms will enter the industry, supply will increase, and price will be driven down toward the equilibrium, zero-profit level.⁹³

⁸⁸ Rosen Report I, ¶ 3.16; and Expert Report of John T. Boyd Company (Michael Wick), 5 December 2016 (“Wick Report I”), p. 6.7.

⁸⁹ **R-798**, PPI Energy and Chemicals Team, “The Effects of Shale Gas Production on Natural Gas Prices,” U.S. Bureau of Labor Statistics (“BLS”), *Beyond the Numbers 2*, no. 13, May 2013, p. 2, accessed 3 November 2017, <https://www.bls.gov/opub/btn/volume-2/pdf/the-effects-of-shale-gas-production-on-natural-gas-prices.pdf>.

⁹⁰ **C-1152**, Stone (Crushed) Statistics, U.S. Geological Survey (1900-2014), 28 January 2016. The USGS reported these figures in 1998 U.S. dollars.

⁹¹ Wick Report I, p. 8.2.

⁹² Rosen Reply Report, Schedule 3. The [REDACTED]
[REDACTED] Inflation reflects the consumer price index growth from mid-2011 to mid-2016 from the U.S. Bureau of Labor Statistics. **R-799**, BLS CPI Inflation Calculator, <https://data.bls.gov/cgi-bin/cpicalc.pl>.

⁹³ **R-800**, James R. McGuigan and R. Charles Moyer, *Managerial Economics*, Fourth Edition (St. Paul, MN: West Publishing Company, 1986), pp. 395 and 398. The term “profits” in this context means “returns in excess of a normal return to compensate the entrepreneur for interest on funds invested in the firm and the value of labor services (even though the entrepreneur may not receive an explicit salary from the firm) plus an additional amount that is just sufficient to keep the entrepreneur producing the same product, given the special risks associated with its production and sale.”

74. The “zero-profit” referred to in this statement references the lack of *economic* profit. Economic profits are defined differently from accounting profits. An economic profit refers to returns that are in excess of those required to compensate suppliers for adding new supply capacity. At the zero-economic-profit level, a company’s prices would be sufficient to cover its expenses as well as a return on its capital for new supply capacity that compensates for the risks associated with its business.
75. The increases in prices over the last decade that I refer to above resulted in profit margins for aggregates producers, such as Martin Marietta and Vulcan Materials, that were above historical averages.⁹⁴ High profit margins tend to attract new supply. Examples of entry of new supply in these conditions include the construction of the large Nova Scotia Black Point quarry announced by Vulcan and Continental Stone’s 2014 announcement of interest in restarting the previously stalled development of the Belleoram quarry in Newfoundland.⁹⁵ The competitive response would be expected to cause high prices to decline and profit margins to revert toward normal levels.
76. Forecasters often recognize the potential for short-term imbalances by assuming that markets will return to pricing based on the long-term marginal cost of supply. As noted in an introductory microeconomics book:
- When short-run profits exist in an industry, firms enter and existing firms expand. These events shift the industry supply curve to the right. When this happens, price falls and ultimately [economic] profits are eliminated.⁹⁶
77. Mr. Rosen has not conducted any analysis of the impact of new entry and its effect on prices over the long term. Instead, Mr. Rosen speculates that the record high prices he assumes for 2016 persist for decades without attracting competition that would drive prices down to normal levels.

⁹⁴ Chodorow Rejoinder Appendix F, Tables F.11 and F.13.

⁹⁵ C-1092, Black Point Environmental Impact Statement - Table of Concordance and Summary Report, February 2015, pp. 4-5 and 24; and R-724, Continental Stone Limited, “Environmental Assessment Registration Document,” Newfoundland and Labrador Department of the Environment and Conservation, October 2014.

⁹⁶ R-801, Karl E. Case, Ray C. Fair, and Sharon M. Oster, *Principles of Microeconomics*, Ninth Edition (Upper Saddle River, NJ: Princeton Hall, 2009), pp. 178 and 196. Here, “profits” implies economic profits since, $profits = total\ revenue - total\ costs$, where “total cost includes a normal rate of return” so that “profit takes into account the opportunity cost of capital.”

78. Given the long history of real price declines in aggregates and the Claimants' lack of analysis of long-term marginal cost, Mr. Rosen's assumption that prices will increase with inflation from 2016 to 2060 is speculative and inconsistent with the long-term aggregates pricing patterns.

5. Mr. Rosen's Assumed Prices Fail to Account for [REDACTED]

79. The first SCMA report stated that Whites Point aggregates have [REDACTED] [REDACTED] Mr. Rosen relies on the conclusion of Mr. Cullen that Whites Point aggregates have [REDACTED] [REDACTED]⁹⁷ Therefore, Mr. Rosen makes no adjustment to the price for [REDACTED] [REDACTED]

80. As discussed in the SCMA Rejoinder Report, asphalt is made by combining aggregates with bitumen. Aggregates with higher absorption properties will absorb part of the bitumen into the aggregates, and therefore require more bitumen to produce a given volume of asphalt.⁹⁸ [REDACTED]⁹⁹ This is [REDACTED] [REDACTED] the 0.77% rate for the Martin Marietta Auld's Cove aggregates on which Mr. Rosen bases his assumed prices.¹⁰⁰ Even if [REDACTED] [REDACTED] [REDACTED] [REDACTED]. The [REDACTED] [REDACTED] [REDACTED] [REDACTED]

81. Mr. Dooley suggests that [REDACTED].¹⁰¹ Despite this, Mr. Rosen assumes Whites Point would receive a price [REDACTED] [REDACTED]. While the impact of

⁹⁷ Rosen Reply Report, ¶ 5.26.

⁹⁸ RE-16, SCMA Rejoinder Report, ¶ 38.

⁹⁹ Expert Report of Mercator Geological Services (Michael Cullen), 17 November 2016, Table 1.2, p. 4.

¹⁰⁰ R-802, Georgia Department of Transportation, "Office of Materials and Testing Qualified Products List," 28 August 2017, p. 6 of PDF, accessed 3 November 2017, <http://www.dot.ga.gov/PartnerSmart/Materials/Documents/qpl02.pdf>.

¹⁰¹ Dooley Reply Statement, ¶¶ 63-64.

[REDACTED]

However, this does not justify Mr. Rosen’s decision to ignore the impact of [REDACTED], which causes him to overstate lost profits.

C. MR. ROSEN’S ASSUMED SALES [REDACTED] ARE INCONSISTENT WITH BNS’ STATED MARKETING PLAN AND [REDACTED]

82. Mr. Rosen assumes that Whites Point would have sold three products: traditional aggregates, screenings, and grits.¹⁰² The vast majority of Whites Point output would have been traditional aggregates. Mr. Rosen assumes that [REDACTED]¹⁰³ [REDACTED]¹⁰⁴

83. As discussed in my first report, the EIS did not anticipate [REDACTED]. Rather, the Claimants informed the JRP that Whites Point aggregates would be going to southern New Jersey.¹⁰⁵ Thus, the marketing plan assumed by Mr. Rosen is different from the Project that was described to the JRP.

84. In addition, the [REDACTED]⁷

85. However, [REDACTED] Figure

¹⁰² Rosen Reply Report, Schedule 1.

¹⁰³ Rosen Reply Report, ¶¶ 5.18 and 5.19.

¹⁰⁴ Rosen Reply Report, Schedule 2.

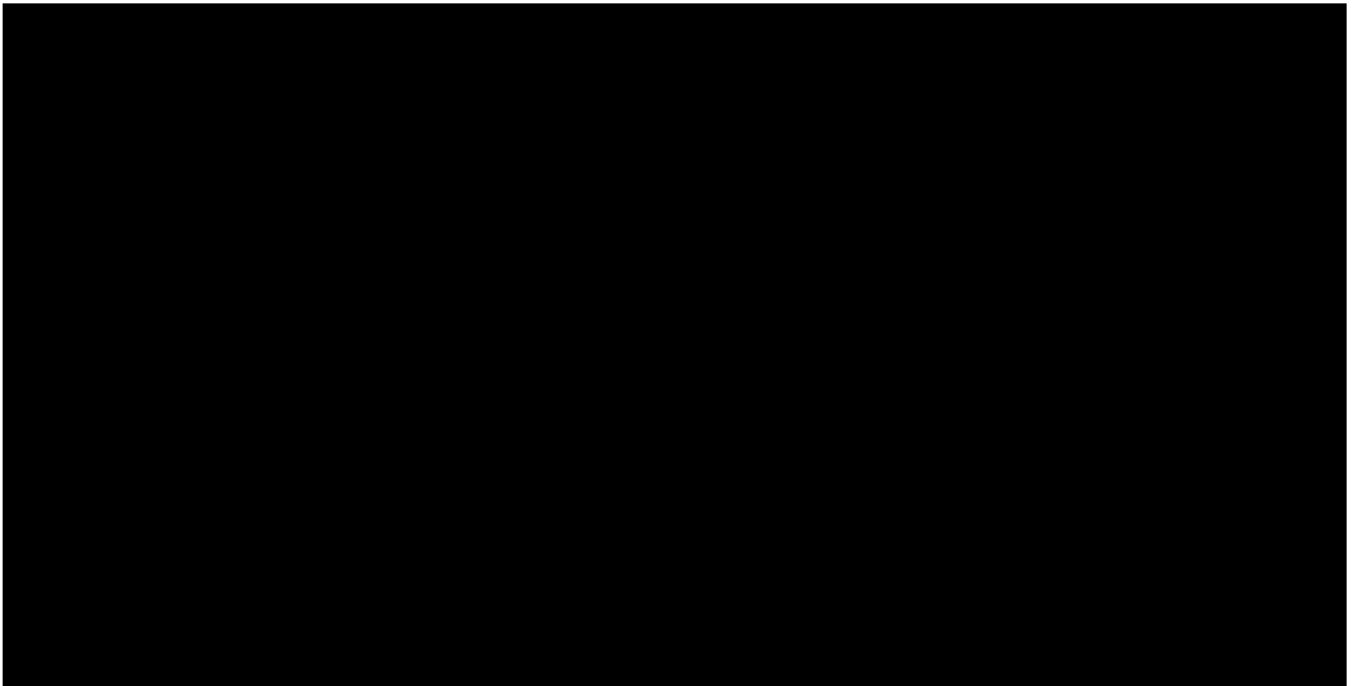
¹⁰⁵ RE-5, Chodorow Report I, ¶ 43.

¹⁰⁶ Dooley Reply Statement, ¶ 16. The grits were assumed to be sold to Amboy Aggregates.

¹⁰⁷ C-1025, Supply Agreement Between NYSS and Martin Marietta Materials, 24 May 2010, p. 6.

4 compares [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

Figure 4: Rosen's Assumed [REDACTED] from Whites Point vs. [REDACTED]



Sources: Rosen Report I, Figure 5.2; Reply Witness Statement of Mr. Fougere, Exhibit 2; C-1025 Supply Agreement Between Martin Marietta Materials and New York Sand and Stone, ¶¶ 5.A and 5.B. See Chodorow Rejoinder Appendix F, Table F.16.

Note: Cargo bills of lading from Martin Marietta to New York Sand and Stone are converted from metric to short tons using the conversion factor of 1.10231 reported by Mr. Fougere.

I have seen no evidence that [REDACTED]

[REDACTED] When asked for documents relating to any inability to obtain aggregates supplies in the absence of Whites Point, the Claimants were unable to provide any such documentation.¹⁰⁸ In addition, when [REDACTED] it told potential buyers that [REDACTED]

¹⁰⁸ R-720, Document Production Request of the Government of Canada, 10 February 2016, Document Request Number 21: "All documents relating to the Claimants' inability or difficulties in acquiring aggregates from alternative sources, or the expected inability to do so in the future..."

[REDACTED].”¹⁰⁹ The fact that
 [REDACTED]
 [REDACTED]
 [REDACTED]

87. While it is possible that Whites Point might have been able to [REDACTED] [REDACTED] the Claimants’ experts have not presented any evidence of where those additional aggregates would be sold and what the prices and freight costs for any such alternative locations would be.

D. MR. ROSEN’S ASSUMED COSTS ARE INCONSISTENT WITH HIS ASSUMED PRODUCT MIX AND LACK TRANSPARENCY

88. The Claimants have not been able to identify any contemporaneous economic analysis which might serve as the basis for a DCF analysis of the Project, such as those commonly undertaken for mining feasibility or pre-feasibility studies. Nor have they identified any contemporaneous forecasts of Project revenues or costs.¹¹¹ Instead, Mr. Rosen relies on assumed costs and marketing and operational plans that were created specifically for the calculation of damages. As I describe below, the operating costs assumed by Mr. Rosen are insufficient to produce his assumed sales and the forecasts lack transparency.

1. The Claimants Have Not Been Able to Provide Any Contemporaneous Thorough Economic Analysis of Whites Point

89. At the time of the breaching JRP report, Whites Point was at an early stage of development. According to Mr. Buxton, the “EIS was drafted at a very early stage of a project, was intended to be conceptual, and was naturally focused on the environmental effects of a project and mitigation measures, not the specifics of the project's business model or design.”¹¹²

¹⁰⁹ C-1026, NYSS Confidential Information Memorandum, January 2014, p. 17. Emphasis added.

¹¹⁰ [REDACTED]. C-1026, NYSS Confidential Information Memorandum, January 2014, p. 29; and Rosen Reply Report, Schedule 1.

¹¹¹ The Claimants were asked to provide any such forecasts in R-720, Document Production Request of the Government of Canada, 10 February 2016, Document Request Number 7 and 8 and were not able to provide any such forecasts.

¹¹² Buxton Reply Statement, ¶ 20.

90. As discussed in my first report, early-stage mining projects are sometimes subjected to pre-feasibility or feasibility studies to demonstrate the economic viability of these projects.¹¹³ Mr. Rosen and I agree that such studies contain careful analyses of a proposed project—Mr. Rosen notes that they “typically present information about the proposed project in a detailed, scientific manner, including a general description of the project, a report quantifying the Mineral Resources, a detailed mine plan, and an economic model of the proposed mine that establishes the Mineral Reserves present at the site.”¹¹⁴ Many pre-production mining projects that have been the focus of investor-State disputes have been subject to such studies, including Rusoro, Gold Reserve, and Crystallex.¹¹⁵ Such studies can provide information that is useful to evaluate the economic viability of pre-production mining projects and information about relevant inputs for a discounted cash flow analysis.
91. The Claimants incorrectly assert that I have stated Bilcon was required to conduct such studies in accordance with Canada’s National Instrument 43-101, which relates to disclosures by companies with publicly traded securities.¹¹⁶ My report did not make any such assertion. I simply noted that a careful economic analysis often associated with such studies, whether fully compliant with the standards for technical reports under NI 43-101 or not, were not available for Whites Point.
92. [REDACTED]

¹¹³ **RE-5**, Chodorow Report I, ¶¶ 87-89.

¹¹⁴ Rosen Reply Report, ¶ 3.20.

¹¹⁵ *See, for example, CA-317, Crystallex International Corporation v. Bolivarian Republic of Venezuela*, (ICSID Case No. ARB(AF)/11/2) Award, 4 April 2016, ¶¶ 23-32 and 884; **CA-316**, *Gold Reserve Inc. v. Bolivarian Republic of Venezuela* (ICSID Case No. ARB (AF)/09/1) Award, 22 September 2014, ¶833; and **CA-345**, *Rusoro Mining Limited v. The Bolivarian Republic of Venezuela* (ICSID Case No. ARB(AF)/12/5) Award, 22 August 2016, ¶ 605.

¹¹⁶ *See, for example, Lizak Reply Report*, p. 29: “Brattle fails to acknowledge that NI-43-101 only applies to a Canadian public company that is a securities regulated issuer that discloses scientific and technical information to the Canadian public about a mineral project... NI-43-101 was never applicable to the Bilcon’s White Point venture.”

¹¹⁷ Lizak Reply Report, p. 26.

¹¹⁸ Lizak Reply Report, p. 29.

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. Mr. William Richard Clayton states that the Claimants conducted their “usual calculations of costs and projections with [their] advisors and in-house accounting staff” based on which they “knew the Whites Point Project would be a money maker.”¹²⁰ The Claimants were asked to produce any such economic models of the Whites Point project.¹²¹ The sole document provided in response to this request was an April 2004 Business Plan prepared by Clayton Concrete.¹²² The plan contained a pro-forma income statement for only one year and was prepared approximately two years before the EIS submission date, which Mr. Buxton stated was still at a “very early stage of a project.”¹²³ I do not consider this to be an economic model consistent with a feasibility or pre-feasibility study, which would typically evaluate the present value or internal rate of return associated with a project. It appears that the Claimants would agree, as the plan was not cited in the materials filed with the Claimants’ first damages memorial.

2. The Claimants’ Assumed Marketing Plan and Operations Are Inconsistent with Each Other

94. Mr. Rosen assumes that Whites Point would achieve a specific mix of traditional aggregates, screenings, and grits. Neither the assumed volume nor the assumed mix is supported by any contemporaneous documentation or forecasts. More importantly, because Whites Point was in the early stage of development, its assumed plant design remained uncertain. For example, the plant configuration presented in Mr. Bickford’s first report did not identify the production capacity of each category of Mr. Rosen’s assumed product mix. Rather, the stockpile of each product was listed receiving production of “XXX tph” (tons-per-hour) rather than a specific hourly production

¹¹⁹ Lizak Reply Report, pp. 31-32.

¹²⁰ Reply Witness Statement of William Richard Clayton, August 21, 2017 (“Clayton Reply Statement”), ¶ 19.

¹²¹ **R-720**, Document Production Request of the Government of Canada, 10 February 2016. *See, e.g.*, Document Request No. 5: “All documents relating to the Claimants’ business plans for the Whites Point project, including but not limited to: a. Internal plans or financial models for purposes of investment analysis/approval/authorization, and all supporting documentation, data, and schedules.”

¹²² **R-717**, Business Plan for Whites Point Quarry, Prepared by Clayton Concrete, April 2004.

¹²³ Buxton Reply Statement, ¶ 20.

volume.¹²⁴ Thus, the Claimants' experts appear to have forecast sales volume and product mix without a completed plant configuration or any attempt to assess whether the proposed facility could produce the assumed sales volumes for each type of product.

95. SCMA has conducted an expert review of Mr. Bickford's new plant configuration. Based on this analysis, SCMA concludes that Mr. Bickford's new plant configuration presents material concerns with respect to Mr. Rosen's sales projections. First, SCMA concludes that Mr. Bickford's new plant configuration cannot [REDACTED]

[REDACTED]¹²⁵ [REDACTED]
 [REDACTED]
 [REDACTED]
 [REDACTED]¹²⁶ Second, the
 [REDACTED]
 [REDACTED]
 [REDACTED]¹²⁷

96. The material inconsistency between the Claimants' newly created plant configuration and Mr. Rosen's assumed sales volume for each product type highlights the material uncertainty about what Whites Point would produce, the volumes that the quarry would ultimately sell, and the price it would receive for those sales.

3. Mr. Rosen's Cost Forecast Cannot Produce His Assumed Product Mix

97. The Claimants assume that the Whites Point quarry would yield marketable product equal [REDACTED]¹²⁸ SCMA demonstrates that Whites Point [REDACTED]
 [REDACTED]¹²⁹ The [REDACTED] would result in higher production costs than assumed

¹²⁴ C-1001, Crushing Plant Drawings and Schedule with George Bickford's Handwritten Notes, Revision D.

¹²⁵ RE-16, SCMA Rejoinder Report, ¶ 43 and Figure 2.

¹²⁶ RE-16, SCMA Rejoinder Report, ¶ 42.

¹²⁷ RE-16, SCMA Rejoinder Report, ¶ 45; and RE-8, Expert Report of SC Market Analytics, 9 June 2017, ¶ 86.

¹²⁸ Reply Witness Statement of George Bickford, 8 August 2017, ¶ 31.

¹²⁹ RE-16, SCMA Rejoinder Report, ¶ 49 and Figure 2.

by Mr. Rosen,¹³⁰ causing him to overstate damages. I note that the Claimants have not presented *any analysis* of [REDACTED]

98. Attempts to meet Mr. Rosen’s assumed production of grits would require Whites Point to

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]. In fact, in the EIS, the Claimants suggested that they did not see a market for any excess volumes.¹³² Further, as I noted above, [REDACTED]

[REDACTED]
[REDACTED].¹³³ As such, there is no evidence to suggest that [REDACTED]
[REDACTED]
[REDACTED]

4. The Claimants’ Operating Cost Assumptions Lack Transparency

99. In the absence of an actual operating history and without projections made in the normal course of business, Mr. Rosen relies upon forecasts of operating costs prepared specifically for this proceeding by Messrs. Buxton, Fougere, and Wall.¹³⁴ Mr. Lizak states that a reliable analysis should provide sufficient information to replicate the data, analyses, and results “so that the reviewer can verify the author’s data, methods, and conclusions.”¹³⁵ The operating cost projections relied upon by Mr. Rosen lack this transparency.

¹³⁰ RE-16, SCMA Rejoinder Report, ¶ 49 and Appendix B.

¹³¹ RE-16, SCMA Rejoinder Report, ¶ 43 and Figure 2. C-629, Whites Point Quarry and Marine Terminal Responses Volume II, p. 366 of PDF.

¹³² R-581, Whites Point Quarry & Marine Terminal, Revised Project Description, 1 November 2006 (“Revised Project Description”), p. 137.

¹³³ See Figure 4 above and Chodorow Rejoinder Appendix F, Table F.16.

¹³⁴ Rosen Reply Report, Notes to Schedule 4.

¹³⁵ Lizak Reply Report, p. 22.

100. For example, my first report highlights that Mr. Rosen’s analysis appears to exclude the ongoing environmental monitoring costs that would have been required according to Mr. Oram’s report.¹³⁶ Mr. Buxton’s reply states that some of these monitoring costs were contained in the Project’s management costs.¹³⁷ However, Mr. Buxton’s estimate of management costs is a black box that provides no insight into what managerial expenses these refer to and how they were estimated.¹³⁸
101. Assumptions underlying other types of costs, such as energy costs (e.g., what diesel price forecast underlies Mr. Buxton’s diesel cost-per-ton of aggregates), are similarly opaque. For example, in response to SCMA’s finding that the Claimants’ costs did not properly account for waste in the operating cost assumptions, Mr. Rosen asserts that [REDACTED]
[REDACTED]
[REDACTED] There are, however, no detailed cost projection calculations to support this claim, and SCMA has demonstrated that Mr. Rosen’s costs did not account for waste.¹⁴⁰ Without explicit information about how these projections were developed, it is not possible to confirm whether the costs assumed by Mr. Rosen are reasonable.
102. Despite the lack of transparency generally surrounding Mr. Rosen’s assumed costs, in some instances it is clear that his analysis continues to exclude costs. For example, as the Claimants’ expert Mr. Oram noted, the environmental monitoring costs required to maintain compliance with his assumed permit conditions would have started prior to construction.¹⁴¹ Mr. Rosen’s analysis, however, includes no environmental monitoring costs prior to the start-up of operations.¹⁴²

¹³⁶ **RE-5**, Chodorow Report I, ¶¶ 151-152.

¹³⁷ Buxton Reply Statement, ¶ 56.

¹³⁸ **C-1010**, Whites Point Operating Costs, 2011-2015.

¹³⁹ Rosen Reply Report, ¶ 5.49.

¹⁴⁰ **RE-16**, SCMA Rejoinder Report, ¶¶ 47-49.

¹⁴¹ Expert Report of GHD Limited (Peter Oram), 6 December 2016, p. 8.

¹⁴² Rosen Reply Report, ¶5.55 and Schedule 1. While Mr. Buxton states that some of the costs referred to by Mr. Oram were in his operating costs, Mr. Rosen assumes no operating costs prior to 2011. Similarly, Mr. Buxton states that he intended his estimate of management costs to include the cost of “Environmental Manager,” but this the management costs prior to 2011 do not include the cost of this employee. Buxton Reply Statement, ¶¶ 51-57 and 61-62.

E. MR. ROSEN VALUES A PROJECT THAT OPERATES DIFFERENTLY AND IS MORE VALUABLE THAN THE ONE ANTICIPATED DURING THE JRP PROCESS

103. BNS described how the Project would operate in March 2006 as part of the EIS and reiterated those expectations in late 2006 and into 2007. Specifically, BNS repeated to various Canadian ministries the EIS-specified annual production volumes, project lifespan, and tons to be shipped per week in January 2007 and again the same EIS annual production volumes and operational schedule to the JRP in June 2007.¹⁴³
104. I offer no opinion on whether BNS was obligated to operate in accordance with statements in the EIS, to Canadian ministries, or to the JRP. I assume that the statements made by BNS in 2006 and 2007 are consistent with their expectations at the time, and I am aware of no contemporaneous documents that describe material changes to these expectations. BNS itself believed that “the extensive research conducted for the EIS [was] of the highest quality.”¹⁴⁴ As such, I assume that the statements made in the EIS and subsequent proceedings reflect the BNS’ expectations about how the Project would have operated.
105. As I noted in my first report, many of the assumptions adopted by Mr. Rosen and other witnesses are inconsistent with expectations for the Project at the time of the breach.¹⁴⁵ Table 4 highlights several of these discrepancies. Because of these altered assumptions, Mr. Rosen has effectively valued a project that is different *and more valuable* from the Whites Point quarry anticipated at the time of the breach.

¹⁴³ **R-330**, Whites Point Quarry and Marine Terminal Project, Information Profile Bilcon of Nova Scotia Corporation, 10 January 2007, pp. 3, 11. *See also*, **C-990**, Whites Point Quarry and Marine Terminal, Project Description, Presentation to the Joint Review Panel, 26 June 2007, p. 14 of PDF.

¹⁴⁴ **R-575**, Whites Point Quarry & Marine Terminal, Environmental Impact Statement, Volume I – Plain Language Summary, 31 March 2006, p. 9.

¹⁴⁵ **RE-5**, Chodorow Report I, ¶¶ 114-119.

Table 4: Comparison of Pre-Breach Expectations to Mr. Rosen's Assumptions

Operating Parameter		Pre-Breach Expectation	Mr. Rosen's Assumption
		[1]	[2]
Operating Life of Quarry	[A]	50 years	[REDACTED]
Resources	[B]	100,000,000 tons	[REDACTED]
Peak Annual Production	[C]	2,000,000 tons	[REDACTED]
Primary Market Served	[D]	Southern New Jersey	New York City
Vessel Capacity	[E]	45,000 tons	[REDACTED]
Tons per Voyage	[F]	40,000 tons	[REDACTED]

Sources:

[1]: R-581, Revised Project Description, pp. 6-7, 15-16, 24, 40, 96, and 137.

[2]: Rosen Reply Report, ¶¶ 5.6-5.16, 5.23-5.27, and 5.29; Morrison Reply Report, ¶ 19; Rosen Report I, ¶¶ 3.8 and 5.9.

With regard to the peak annual production volume of [REDACTED] [REDACTED] [REDACTED].¹⁴⁶ Mr. Buxton then opines that [REDACTED] [REDACTED].¹⁴⁷ From a review of EIS documents, I am unable to conclude that it is clear that [REDACTED]. First, Mr. Buxton's statement [REDACTED] conflicts with materials the Claimants shared with the JRP in 2007 describing Whites Point as having "capacity of 2 million tons per year at full capacity."¹⁴⁸ Second, production volume units are reported inconsistently in the EIS and Revised EIS. In most cases, however, the volume unit is tons. The use of "tons," as opposed to "tonnes" or "metric tonnes," is even more common in documents created closer to the breach date, presumably as details were closer to finalization. In multiple instances, volumes once referred to in "tonnes" in an earlier document are updated to be "tons" in a later document. Appendix G presents a review of references to tons, tonnes, or metric tons in various documents describing the Project.¹⁴⁹ While this is not an exhaustive review, it highlights the uncertainty about whether volumes were intended to be in short tons or metric tons. Because the later documents,

¹⁴⁶ Buxton Reply Statement, ¶¶ 32-33.

¹⁴⁷ Buxton Reply Statement, ¶ 34.

¹⁴⁸ C-629, Whites Point Quarry and Marine Terminal Responses Volume II, p. 366 of PDF.

¹⁴⁹ My review of materials for Chodorow Rejoinder Appendix G sought to include documents containing descriptions of production quantities for the project dated from 31 March 2006 – 22 October 2007 for which key word searching returned any of the following terms: "tons," "tonnes," "metric ton(ne)s," or "short ton(ne)s."

which more frequently cite a volume unit of “tons,” were likely subjected to a higher degree of vetting and scrutiny, I have no basis to conclude that BNS was intending to produce 2 million metric tonnes rather than 2 million short tons.

107. The Claimants also incorrectly assert that I assume BNS would behave irrationally by estimating the value of Whites Point based on shipments of [REDACTED].
[REDACTED] For the purpose of this proceeding, the Claimants have assumed [REDACTED].¹⁵⁰
Mr. Buxton states that [REDACTED].
[REDACTED]
[REDACTED]
[REDACTED]
Similarly, Mr. Morrison states [REDACTED].
[REDACTED] With respect to this point, it is not my opinion that [REDACTED]
[REDACTED]—it is what BNS stated in its EIS.¹⁵³

108. The Claimants argue that they are not required to adhere strictly to the description in the EIS.¹⁵⁴ I do not offer an opinion on this matter. However, regardless of whether or not this claim is accurate, it is reasonable to assume that the Claimants’ statements in the EIS or other JRP documents reflect their expectation of how Whites Point would operate, and Mr. Rosen’s analysis assumes operations that are materially different.

V. Mr. Rosen’s Valuation Is Excessive

109. Mr. Rosen’s revised assessment of lost profits of US\$308 million is more than three times the value referenced in the Statement of Claim.¹⁵⁵ Given this large difference, and the fact that Whites Point never operated, was at an early stage of development, and lacked any

¹⁵⁰ Rosen Reply Report, ¶¶ 5.29-5.33; and Expert Reply Report of Tamarack Resources (Wayne Morrison), 18 August 2017 (“Morrison Reply Report”), ¶¶ 15-21.

¹⁵¹ Buxton Reply Statement, ¶ 37.

¹⁵² Morrison Reply Report, ¶ 20.

¹⁵³ R-581, Revised Project Description, p. 24. I note that the discrepancy between vessel size and volumes loaded is not explained by the difference between tons and metric tonnes.

¹⁵⁴ See, for example, Oram Reply Report, p. 1.

¹⁵⁵ RE-5, Chodorow Report I, ¶ 96.

thorough contemporaneous economic assessment, it is important to test the reasonableness of Mr. Rosen's valuation.

110. Independent benchmarks are available to test the reasonableness of Mr. Rosen's analysis. The profit margins implied by Mr. Rosen's analysis can be compared to profits margins earned by publicly traded aggregates producers. Mr. Rosen's valuation can also be compared to market value indicators for Whites Point from different points in time, as discussed in my first report. In his reply, Mr. Rosen dismisses both of these considerations. However, as I describe below, these benchmarks should be considered and demonstrate that Mr. Rosen's assumed profits margins are extremely high and his resulting valuation is excessive.

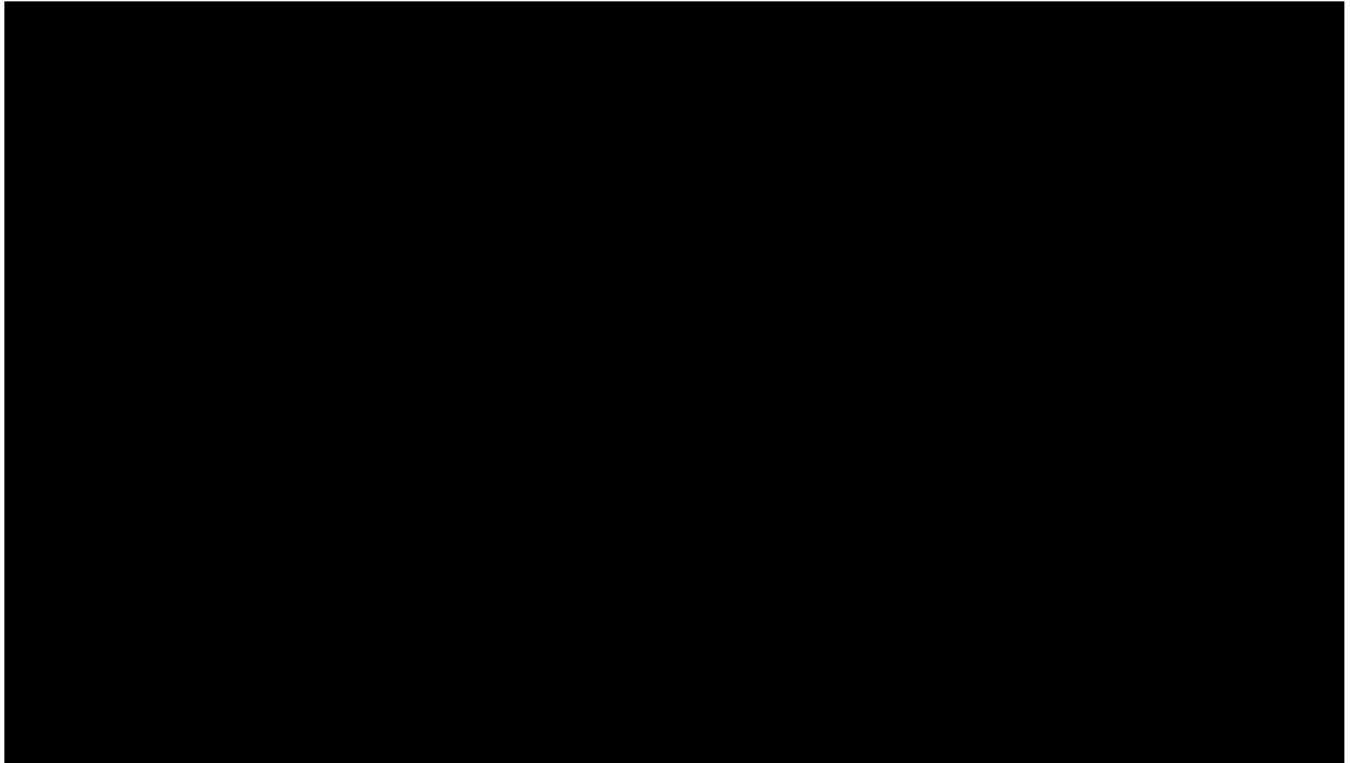
A. MR. ROSEN'S ANALYSIS RESULTS IN PROFIT MARGINS THAT ARE EXCESSIVE COMPARED TO PUBLICLY TRADED COMPANIES

111. The profit margins underlying Mr. Rosen's analysis can be tested against those earned by publicly traded aggregates producers. Mr. Rosen agrees that such an analysis could be done based on gross profit margins.¹⁵⁶ Figure 5 compares the gross profit margins from Mr. Rosen's DCF analysis to those earned by the publicly traded aggregates producers. The comparison shows that the gross profit margins assumed by Mr. Rosen are far in excess of those earned by publicly traded aggregates producers.¹⁵⁷

¹⁵⁶ Rosen Reply Report, ¶ 5.53.

¹⁵⁷ The same is true for all of the companies that Mr. Rosen assumed as comparables in his analysis. I focus on Martin Marietta and Vulcan because they have a narrower focus on aggregates. Chodorow Rejoinder Report, Appendix F. 12.

**Figure 5: Gross Margins for Whites Point and Publicly Traded Aggregate Producers
2011 - 2016**



Sources and Notes: Mr. Rosen's estimation of Whites Point is calculated as 'Gross Margin' / 'Total' of 'Revenues, net of freight.' Gross margins for Vulcan Materials and Martin Marietta Materials in each year are calculated as ('Sales-Net' - 'Cost of Goods Sold') / 'Sales-Net' using data from Compustat Research Insight, accessed 30 October 2017. See Chodorow Rejoinder Appendix F, Table F.12.

112. Among these public companies, Mr. Rosen focuses on Martin Marietta. He states that “the Whites Point project [has] greater than [REDACTED]” and that “Martin Marietta Materials, Inc. has lower margins on a consolidated basis for a number of reasons.”¹⁵⁸ Mr. Rosen references four reasons that the Martin Marietta margins should be lower: (1) Martin Marietta sells different products into different markets; (2) its operations include less modern quarries; (3) “other costs”; and (4) private companies have greater profitability than public companies.¹⁵⁹
113. Sales of different product mixes in different geographic markets and differences in quarry efficiency may lead to different margins for Whites Point and Martin Marietta or Vulcan. Mr. Rosen is unclear about what these “other costs” are, as he provides no detail or citation for this claim. While such factors could lead to differential profitability, Mr. Rosen has not

¹⁵⁸ Rosen Reply Report, ¶ 5.53.

¹⁵⁹ Rosen Reply Report, ¶¶ 5.53-5.54.

analyzed whether these or other factors explain the vastly higher profitability of Whites Point reflected in his forecast.

114. With respect to the difference in profitability, Mr. Rosen relies upon the report of Claimants' expert Mr. George Seamen. Mr. Seamen states of privately held aggregate producers that: "[t]heir approach to business goals can be very different, often resulting in the profitability of a modern, well-run private aggregate company being double or more than that of [a] large public aggregate company."¹⁶⁰ This assertion is not supported by *any* data, documents, or financial analysis and cannot be verified.
115. Data provided by the Claimants allow one to compare the profitability of the Clayton Group, a privately held company, with that of comparable public companies to assess Mr. Seamen's claim. The Clayton Group's business is sales of aggregates and concrete.¹⁶¹ In his initial witness statement, Mr. Forestieri presents data that can be used to calculate the Clayton Group's gross profit margins for each year from 2001 to 2016.¹⁶² In his first report, Mr. Rosen identified six publicly traded companies that operate in the aggregates and concrete business to estimate the discount rate, which he refers to as "comparable companies."¹⁶³ Figure 6 compares the gross profit margins for the Clayton Group to those of the six comparables. This figure demonstrates that despite its private ownership, the Clayton Group [REDACTED], as Mr. Seamen's opinion would imply. Instead, [REDACTED]
[REDACTED]

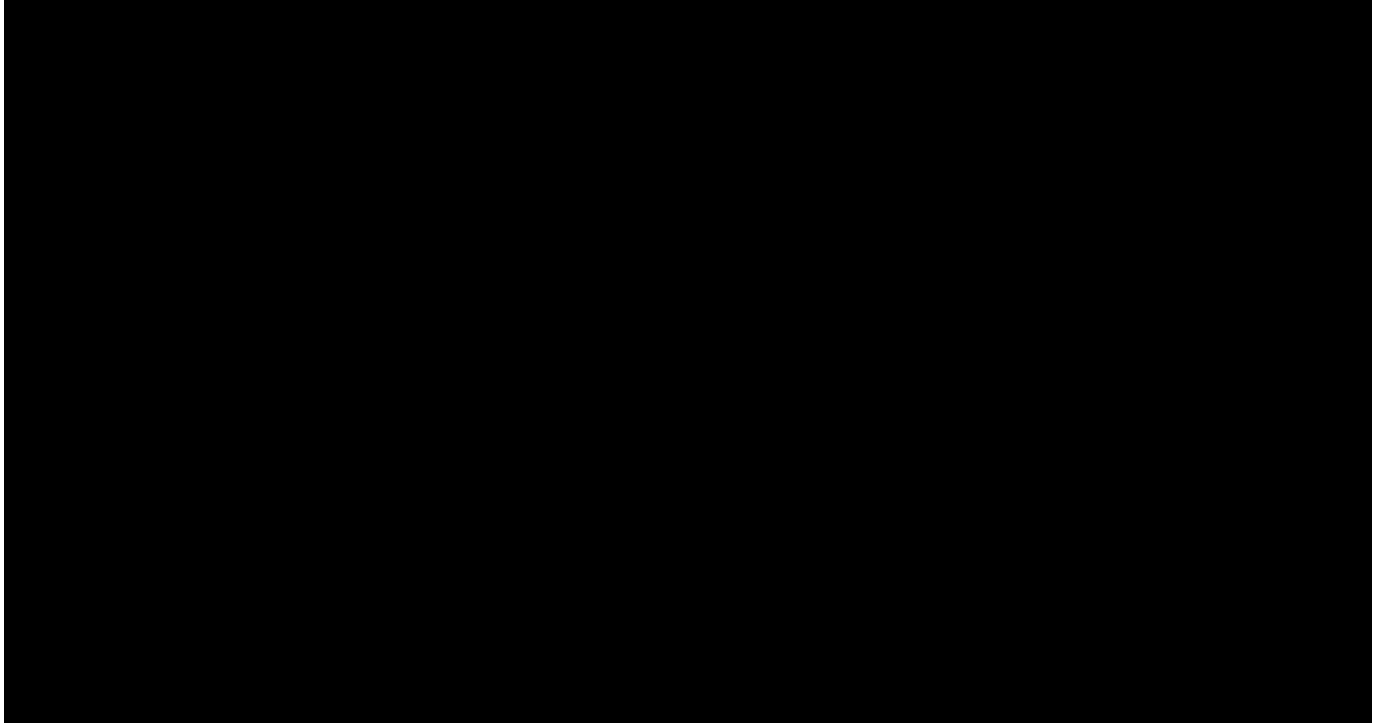
¹⁶⁰ Expert Reply Report of GS Management Inc (George S. Seamen Jr), 10 August 2017, ("Seamen Reply Report"), p. 1.

¹⁶¹ Forestieri Witness Statement, p. 2. Mr. Forestieri refers to Clayton Group and Clayton Companies interchangeably.

¹⁶² **C-1447**, Clayton Companies Financial Information, 2001 to 2016.

¹⁶³ Rosen Report I, ¶¶ 5.44, A4.19, and Schedule 16.

**Figure 6: Clayton Group Gross Margins vs. Rosen's Comparables
2001 - 2016**



Sources and Notes: The gross margin for Clayton Group is calculated as ('Net-Sales' - 'Cost of Sales') / 'Net Sales' using C-1447. Gross margins for all other companies in each year are calculated as ('Sales-Net' - 'Cost of Goods Sold') / 'Sales-Net' using data from Compustat Research Insight, accessed 30 October 2017. Figures shown for Eagle Materials refer to the fiscal year starting March of the listed calendar year. See Chodorow Rejoinder Appendix F, Table F.12.

116. Mr. Seamen's view also appears to be in contrast with that of other industry analysts. BB&T industry analyst Adam Thalhimer described the perspective of private aggregate companies as follows: "When I talk to private aggregates companies, they point to Vulcan as the best-run company in the space."¹⁶⁴ Thus, while Mr. Rosen argues that it is reasonable for assumed gross profit margins for a privately held Whites Point quarry to be approximately double those of publicly traded companies, the available evidence does not support his proposition.

¹⁶⁴ **R-803**, James Detar, "Investors Love Vulcan Materials' Results Like A Rock," Investor's Business Daily, 5 July 2016, accessed 3 November 2017, <https://www.investors.com/research/the-new-america/vulcan-materials-hammers-out-gains-as-construction-recovery-builds/>.

B. MR. ROSEN'S VALUATION IS EXCESSIVE IN COMPARISON TO MARKET INDICATIONS OF VALUE

117. A valuation practitioner will, where possible, typically use multiple methods (e.g., DCF and comparables) when valuing an asset to develop a more reliable valuation.¹⁶⁵ Mr. Rosen uses only the DCF method. The market value indicators set forth in my first report can be used to assess the reasonableness of Mr. Rosen's DCF valuation. The consideration of such evidence is particularly important given that Whites Point was never constructed, lacks feasibility and pre-feasibility studies, and that there was material uncertainty about the Project's potential operating characteristics and profitability.
118. My first report demonstrated that the present value of BNS' lost profits, estimated by Mr. Rosen as of 31 December 2016, was excessive relative to these market indicators of value.¹⁶⁶ Mr. Rosen argues that these market indicators are not relevant. First, Mr. Rosen states that Whites Point was worth more to the Claimants than to other market participants due to the potential for vertical integration with the Clayton Group of Companies.¹⁶⁷ Second, he claims that my interpretation of the transaction and offer terms is flawed.¹⁶⁸ Third, Mr. Rosen argues that each of the market indicators occurred many years before the award date, and that there is no basis to support my use of indexation to publicly traded aggregates companies to move these value indicators through time.¹⁶⁹ Finally, Mr. Rosen assumes that the returns on investment for private aggregates operators like Whites Point should be materially higher than those of publicly traded aggregates companies.¹⁷⁰
119. I explain in the sections that follow why the market value indicators are relevant and show how they demonstrate that Mr. Rosen's valuation is excessive.

¹⁶⁵ In situations where it may be possible to use multiple methods, one result may still be superior. The use of multiple methods is not always possible.

¹⁶⁶ **RE-5**, Chodorow Report I, ¶¶ 92-100.

¹⁶⁷ Rosen Reply Report, ¶ 4.3-4.7.

¹⁶⁸ Rosen Reply Report, ¶ 4.14-4.28.

¹⁶⁹ Rosen Reply Report, ¶ 4.9-4.13.

¹⁷⁰ Rosen Reply Report, ¶ 5.54.

1. Whites Point Is Not Worth More to BNS than to Other Potential Owners

120. Mr. Rosen’s chief objection to the use of the market indicators to assess Whites Point’s value is that the executed or proposed transactions do not represent the value of lost profits to the Claimants but rather the value of Whites Point to other market participants.¹⁷¹
121. In Mr. Rosen’s opinion, an estimate of damages based on the fair market value (“FMV”) of Whites Point is flawed because it “assumes that the Investors intended to put the Whites Point project up for sale and would, absent the Respondent’s breaches of the Treaty, potentially accept a price different than the present value of the profits they could receive by operating the project themselves.”¹⁷² Mr. Rosen opines that the relevant standard for valuing Whites Point in this proceeding is therefore one which is “ultimately concerned with the perspective of investors rather than the view of the general market.”¹⁷³ Mr. Rosen suggests that Whites Point would have been more valuable to the Claimants because they would have “vertically integrated the quarry into the Clayton Group of Companies.”¹⁷⁴
122. I agree with Mr. Rosen that there can be a distinction between an asset’s FMV and its value to a particular owner. However, in this instance there is no support for the contention that Whites Point would have generated higher profits for BNS than it would have generated for other owners due to vertical integration.¹⁷⁵ Vertical integration would not cause [REDACTED]
[REDACTED]
[REDACTED].¹⁷⁶ Nor have the Claimants presented any evidence to support the conclusion that vertical integration would have provided Whites Point with an [REDACTED]
[REDACTED]
[REDACTED] Without evidence of such synergies, there is no basis to conclude that the profits of Whites Point would have been higher if the Project were owned by BNS rather

¹⁷¹ Rosen Reply Report, ¶¶ 4.7-4.8.

¹⁷² Rosen Reply Report, ¶ 4.7.

¹⁷³ Rosen Reply Report, ¶ 4.7.

¹⁷⁴ Rosen Reply Report, ¶ 4.4.

¹⁷⁵ Rosen Reply Report, ¶ 4.4.

¹⁷⁶ See ¶ 62.

than a third party. Simply put, it is speculation to assume that the Whites Point profits would have a value to BNS that exceeds the FMV of the Project.

█ The Claimants have stated that █
 █.¹⁷⁷ This suggests that █
 █ As discussed earlier, experience shows that █
 █
 █⁸ However, even if it had, any █

124. I am not aware of any analysis in which the Claimants have quantified any lost profits for █ Moreover, I am instructed by the Respondent's counsel that lost profits of █¹⁷⁹ if any, would not be recoverable as damages in this proceeding as a legal matter. To argue that the Claimants would have required a price in excess of fair market value to be a willing seller of Whites Point because Whites Point would have allowed them to generate more profits from █ is the economic equivalent of allowing a claim for lost profits from █

2. The Market Value Indicators Provide Insight into the Contemporaneous Value of Whites Point

125. Aside from his opinion that the FMV of Whites Point is not a relevant measure of damages in this proceeding, Mr. Rosen states that the market indicators are inappropriate for other reasons. Mr. Rosen's critiques of the market value indicators are invalid.

a. The April 2002 Global Quarry Products Joint Venture Formation Price Is a Relevant Market Indicator of the Value of the Project

126. Mr. Rosen argues that my assessment of the value of Whites Point implied by the formation terms of the Global Quarry Products joint venture ("JV") to develop Whites Point is incorrect. Specifically, he states that my analysis is flawed because █
 █

¹⁷⁷ Dooley Witness Statement, ¶ 91.

¹⁷⁸ See ¶¶ 83-87.

¹⁷⁹ This would also apply to other assets owner wholly or partially by the Clayton Group of Companies.

[REDACTED]
[REDACTED] ”180
.

127. Mr. Rosen misunderstands the terms of the transaction and how those terms demonstrate the value of the Project at the time. First, my analysis includes [REDACTED]
[REDACTED] As I explained, the Claimants’ [REDACTED]
[REDACTED]
[REDACTED] .181

128. Second, my analysis properly accounted for [REDACTED]
[REDACTED], as shown in Figure 7. The
Claimants [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]. Thus, Mr. Rosen is incorrect to assert that I have failed
to account for [REDACTED]
[REDACTED]

Figure 7: Whites Point Value Implied by GQP Formation Contributions



Source: RE-5, Chodorow Report I, ¶¶ 73-75.

¹⁸⁰ Rosen Reply Report, ¶ 4.18.

¹⁸¹ RE-5, Chodorow Report I, ¶¶ 73-75. Note that while [REDACTED]
[REDACTED].

¹⁸² C-5, Letter of Intent from Bilcon of Delaware, Inc. to Nova Stone Exporters, Inc., 28 March 2002, ¶¶ 3-5.

129. Mr. Rosen argues that the Project was, at the time, very different from the version of Whites Point later contemplated.¹⁸³ I agree that the Project was at an early stage of development. However, the expected output of Whites Point envisioned at the time was the same [REDACTED] as it was at the time of the EIS, and the estimated aggregates deposit was larger at the time the JV was formed. Thus, while the Project was at an early stage of development at the time, the Claimants have not explained why the transaction price is not indicative of the contemporaneous value of the Project.¹⁸⁴
130. Mr. Rosen also suggests that this transaction did not occur at fair market value [REDACTED].¹⁸⁵ The fact that [REDACTED] does not mean that the observed transaction value does not reflect market value. [REDACTED]
131. Based on these considerations, it is reasonable to conclude that the implied [REDACTED] price was a reasonable reflection of the FMV for the project at the time assuming it were to receive all necessary approvals and permits.

b. BNS' April 2004 Purchase of the NSE Stake in Whites Point Is a Relevant Market Indicator

132. In April 2004, NSE sold its [REDACTED] stake in the Project to BNS [REDACTED].¹⁸⁶ Mr. Rosen dismisses this transaction based on the belief that [REDACTED].¹⁸⁷ This belief is based upon the recollection of Mr. Buxton that, [REDACTED]

¹⁸³ Rosen Reply Report, ¶ 4.19.

¹⁸⁴ RE-5, Chodorow Report I, ¶¶ 64-76. In fact, Mr. Rosen suggests that the anticipated capital costs were lower than those reflected in the later EIS filing. All else equal, an expectation of lower capital costs would imply the Project was worth more.

¹⁸⁵ Rosen Reply Report, ¶ 4.20.

¹⁸⁶ RE-5, Chodorow Report I, ¶ 78.

¹⁸⁷ Rosen Reply Report, ¶ 4.22.

¹⁸⁸ Rosen Reply Report, ¶ 4.22; and Buxton Reply Statement, ¶¶ 90-92.

133. Mr. Rosen’s conclusion that BNS purchased NSE’s stake in Whites Point at a below-market price is unsupported. My first report noted that there was no evidence that NSE was obligated to sell its stake in Whites Point to BNS,¹⁸⁹ and the Claimants have not disputed this. NSE could have sought alternative buyers if the purchase price offered by BNS was below market value. Since NSE was an economically rational and informed participant in the Project, it is unreasonable to assume NSE would have agreed to sell its stake at a price materially below its assessment of the FMV.¹⁹⁰ Moreover, Mr. William Richard Clayton stated that [REDACTED]
[REDACTED].¹⁹¹
134. Based on these considerations, I conclude that the value of [REDACTED] implied by this transaction is generally consistent with the contemporaneous market value of the Project. This transaction was not contingent on approvals and permitting.

c. The [REDACTED] Offer Is a Relevant Market Indicator

135. [REDACTED] offered to purchase the Whites Point project from the Claimants for a price of [REDACTED]
[REDACTED].¹⁹² Mr. Rosen dismisses [REDACTED] offer as irrelevant because [REDACTED]
[REDACTED].¹⁹³
136. The offer is relevant to understanding [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

¹⁸⁹ RE-5, Chodorow Report I, ¶ 79.

¹⁹⁰ My first report noted that there was no stated requirement that NSE had to sell to BNS, and the Claimants witnesses have not disputed this. RE-5, Chodorow Report I, ¶ 79.

¹⁹¹ Clayton Reply Statement, ¶ 7.

¹⁹² RE-5, Chodorow Report I, ¶ 80.

¹⁹³ Rosen Reply Report, ¶ 4.25-4.28.

¹⁹⁴ [REDACTED] would have had access to information about the site and proposed operations from the EIS, which was a public document.

138. Third, the Claimants themselves appeared to view the offer as relevant. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
139. Thus, even though the [REDACTED] offer is [REDACTED] it is a relevant market indicator of the value of the Project at the time, [REDACTED]
[REDACTED]

3. Indexing the Market Value Indicators for Intertemporal Differences Shows Mr. Rosen's Valuation Is Unreasonable

140. My first report presented an analysis that adjusted, or *indexed*, the indicative market values to reflect changes in market values of aggregate producers between each transaction or offer date and Mr. Rosen's valuation date.¹⁹⁶ Figure 8 demonstrates that Mr. Rosen's updated valuation is far in excess of the market value indications adjusted to Mr. Rosen's assumed award date based on the index of industry returns.

¹⁹⁵ R-590, Letter from [REDACTED] to William Clayton, [REDACTED]

¹⁹⁶ RE-5, Chodorow Report I, ¶ 94 and Figure 2. The index was based on Martin Marietta and Vulcan Materials, which were and continue to be the top two producers of crushed stone in the United States, according to the USGS. See R-809, Advance Data Release of 2015 Annual Tables, USGS Minerals Yearbook 2015, Table 19, accessed 3 November 2017, https://minerals.usgs.gov/minerals/pubs/commodity/stone_crushed/myb1-2015-stonc-advrel.xlsx.

Figure 8: Market Indicators of Whites Point vs. Updated Rosen Valuation



Source: Chodorow Rejoinder Appendix F, Table F.17.

141. Mr. Rosen critiques this analysis on two bases. First, he states that, as of his valuation date, the market value indicators were stale and “Brattle’s approach to indexing deal values to equity returns of unrelated public companies is not supported by any evidence.”¹⁹⁷ Second, Mr. Rosen claims that the results of my indexation approach would [REDACTED]

a. Use of Indexation to Compare Values Across Time Is a Widely Accepted Economic Approach

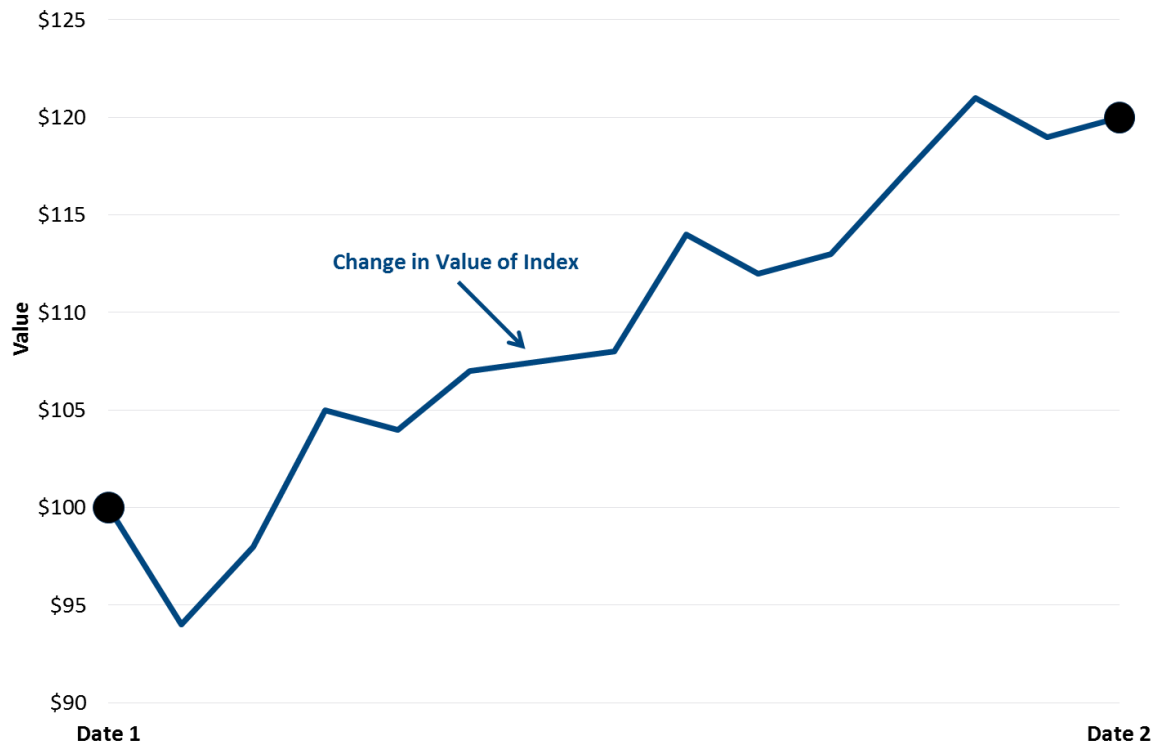
142. Indexation is a relatively simple concept. If an asset has an observed value on Date 1, the value on Date 2 can be estimated by multiplying the value of the asset on Date 1 by the change in an index of observed market values for similar assets between Date 1 and Date 2. For example, if an asset has an observed value of \$100 on Date 1 and the observed market

¹⁹⁷ Rosen Reply Report, ¶ 4.10-4.11.

¹⁹⁸ Rosen Reply Report, ¶ 4.12.

values of similar companies increased by 20% between Date 1 and Date 2, the implied value of the asset on Date 2 is \$120 ($\$100 \times [1 + 20\%]$). The index reflects the change in value arising from changing market conditions reflected in the assets that comprise the index. This approach is illustrated in Figure 9.

Figure 9: Illustration of Indexation Approach



143. Indexation does not work in all cases, but it can be a useful method for adjusting the value of an asset to account for the impact of shifts in market conditions over time on the value of that asset. The approach can be effective for valuing assets that have not experienced material change in the status, characteristics, or asset-specific risks, so that the primary factor that would have affected the market value of the asset is the shift in market conditions.
144. There were no material changes in the status, characteristics, or risks associated with the associated with Whites Point that would prevent the useful application of indexation to the market value indicators for purposes of assessing the reasonableness of Mr. Rosen's valuation. Key aspects of the status, characteristics, and risks for Whites Point were similar for the market value indicators and Mr. Rosen's valuation. While Mr. Rosen assumed

production would be higher than prior expectations, these differences do not explain the large difference between Mr. Rosen's value and the indexed values of Whites Point.¹⁹⁹ Estimates of basalt quantities were sufficient to provide the Project's expected production level over a 50-year project life, and [REDACTED]

[REDACTED] Since construction never occurred for Whites Point, all three market value indicators and Mr. Rosen's assessment all are valuing Whites Point net of all capital expenditures to build the Project. Finally, with respect to permitting risk, Mr. Rosen assumes this away, as do the 2002 GQP Formation and [REDACTED] market value indicators which were [REDACTED]

[REDACTED]²⁰¹ The stability in these key aspects of Whites Point suggests that indexation of prior market value indicators should provide a reasonable view of the value of the Project as of Mr. Rosen's valuation date.

145. While Mr. Rosen questions the use of indexation, it is a widely accepted economic approach. In fact, indexation is the foundation underlying the economic analysis method known as an event study. An event study is an empirical financial tool that "enables an observer to assess the impact of a particular event on a firm's stock price."²⁰² A simple form of event study "measures the stock's abnormal return as its return minus that of a broad market index."²⁰³ That is, an event study evaluates the value of an asset compared to an alternative value that assumes the asset achieved a return based on a market index over some period of time. This is the approach that I use to adjust the market value indicators to Mr. Rosen's valuation date.

¹⁹⁹ **RE-5**, Chodorow Report I, ¶¶ 40, 64, and 69. While Mr. Rosen assumes greater production volumes over the 50-year project life (about 115 million tons vs. 100 million tons), this does not explain the material differences in value between the indexed market value indicators.

²⁰⁰ NSE initially stated that the site had 250 million tons of basalt. Mr. Lizak later said 200 million tons. In 2016, [REDACTED]. All of these are relatively in line with the anticipated production volumes over the project life. **RE-5**, Chodorow Report I, ¶ 64 and 116; and Rosen Reply Report, ¶ 5.15.

²⁰¹ **RE-5**, Chodorow Report I, ¶¶ 70, 79, and 80. The 2004 GQP Buyout does reflect permitting risk, and would therefore be expected to be lower than Mr. Rosen's analysis all else equal, and thus the indexed value would be more comparable to Mr. Rosen's damages estimate if adjusted for permitting risk. The much lower valuation suggests permitting risk may have been a material concern.

²⁰² **R-804**, Zvi Bodie, *et al.*, *Investments*, Ninth Edition, McGraw-Hill Irwin (2011), p. 353.

²⁰³ **R-804**, Zvi Bodie, *et al.*, *Investments*, Ninth Edition, McGraw-Hill Irwin (2011), p. 353.

146. The event study method is widely used in academic research and litigation to evaluate the impact of events on the market value of an asset, such as a stock:

Event study methodology has become a widely accepted tool to measure the economic impact of a wide range of events. For example, the [U.S. Securities Exchange Commission] regularly uses event studies to measure illicit gains captured by traders who may have violated insider trading or other securities laws. Event studies are also used in fraud cases, where courts must assess damages caused by fraudulent activity.²⁰⁴

147. The text *Measuring Business Interruption Losses and other Commercial Damages* describes the “Comparable Index” approach for estimating securities fraud damages:

The comparable index method uses econometric methods to estimate the relationship between a security’s return and the return of the market and the industry. The relationship is estimated and used to compute the security’s “value.” It is then compared to the security’s actual price.²⁰⁵

148. Among other examples of indexation in the academic literature, Keown and Pinkerton (Journal of Finance, 1981) analyze the values of companies indexed to the S&P 500 to assess abnormal returns relative to the index before and after merger announcements.²⁰⁶

149. Indexation has also been recognized as an economically reasonable approach for estimating damages in international arbitration. In fact, tribunals have accepted the use of indexation in the same way that I have applied it here.

150. For example, in *Rusoro Mining vs. Venezuela*, the tribunal recognized that changes in market conditions over time faced by gold mining companies impacted their value. Therefore, the tribunal found that market value indicators from earlier transactions of gold mining assets were no longer applicable when market conditions changed. As a result, the tribunal accepted an indexation method to adjust the value of assets acquired between 2006 and 2011 to a valuation date in 2011 using an index comprised of gold mining companies.²⁰⁷

²⁰⁴ **R-804**, Zvi Bodie *et al.*, *Investments*, Ninth Edition, McGraw-Hill Irwin (2011), p. 355.

²⁰⁵ **R-805**, Patrick A. Gaughan, *Measuring Business Interruption Losses and other Commercial Damages*, 2nd Edition (John Wiley and Sons 2009), p. 338.

²⁰⁶ **R-806**, Arthur Keown and John Pinkerton, *Merger Announcements and Insider Trading Activity: An Empirical Investigation*, Journal of Finance, Vol. 36, Issue 4 (Sep. 1981), pp. 855-869.

²⁰⁷ **CA-345**, *Rusoro Mining Limited v. The Bolivarian Republic of Venezuela*, (ICSID Case No. ARB(AF)/12/5) Award, 22 August 2016, ¶¶ 679-682 (describing the application of the index

151. Similarly, in *Crystallex vs. Venezuela*, the tribunal also applied the indexation methodology to move the observed stock price of a mining project from a date before the threat of an unlawful act to the valuation date applied in the award. The award stated that:

[T]he Tribunal accepts the ‘build-up’ to 2008 performed by the Claimant’s experts which tracks Crystallex’s actual share price movement up to the last trading date that was free of any threat of unlawful act and then makes it evolve according to a relevant industry index. For the Tribunal, such build-up is indeed appropriate to reflect a but-for scenario.”²⁰⁸

152. While Martin Marietta and Vulcan, my index components, are not perfect comparables to Whites Point, their businesses are similar and their performance is driven by similar factors. Mr. Rosen himself acknowledged this in his first report, where he characterized these two entities as “comparable companies” to BNS.²⁰⁹ Given this comparability, one would expect the value of Whites Point to move similarly over time (although not perfectly). The fact that Mr. Rosen’s valuation is a large multiple of the valuations implied by the market value indicators for the Project indexed to Mr. Rosen’s valuation date creates concern about the reliability of his analysis.²¹⁰

b. A Downward Adjustment Based on Indexation Is Perfectly Reasonable

153. Mr. Rosen further concludes that use of indexation generates unreasonable results because adjusting the [REDACTED] offer to the October 2007 breach date would result in a lower value:

[I]t seems that applying Mr. Chodorow’s assumption leads to unreasonable results. For example, [REDACTED]

Continued from previous page

methodology by the claimant’s expert) and ¶ 789 (in which the tribunal accepts the application of this approach and provides it the greatest weight among multiple valuation methods).

²⁰⁸ CA-317, *Crystallex International Corporation v. Bolivian Republic of Venezuela*, (ICSID Case No. ARB(AF)/11/2) Award, 4 April 2016, ¶ 891.

²⁰⁹ Rosen Report I, ¶ 5.44 and Schedule 16. I have excluded other companies that Mr. Rosen included as comparables, but which have a lesser focus on aggregates.

²¹⁰ This is discussed further in Section V.4 below.

²¹¹ Rosen Reply Report, ¶ 4.12.

154. Mr. Rosen does not explain the basis for his suspicion about [REDACTED] based on indexation. Such an adjustment is reasonable. The market value of assets can go up or down over time, and reasonable analysts would be open to evidence of a move in either direction. [REDACTED]
- [REDACTED]
- [REDACTED] I explained in my first report, market conditions for aggregates producers deteriorated significantly in the latter part of 2007 and the stock prices for the two largest publicly traded aggregates producers tumbled between May and October 2007.²¹² Thus, it is economically reasonable to expect that the value of Whites Point also would have declined over this same period.

4. There Is No Basis to Support Mr. Rosen's Implied Extraordinary Returns from the BNS Investment in Whites Point

155. Mr. Rosen's updated analysis assumes that the present value of lost profits at the end of 2016 was US\$308 million.²¹³ The difference between Mr. Rosen's valuation and the market value indicators implies a return that BNS would have earned between the date of that market value indicator and Mr. Rosen's award date. Figure 10 compares his implied returns for BNS to the total equity returns for the publicly traded aggregates companies over the same period. For example, the difference between the [REDACTED] offer price and Mr. Rosen's 2016 valuation implies that the BNS interest in Whites Point would have increased in value [REDACTED] between [REDACTED] and December 2016. In contrast, [REDACTED]
- [REDACTED]. The returns implied by Mr. Rosen's valuation of Whites Point are extraordinary relative to actual returns for Martin Marietta and Vulcan for all three of the market value indicators. However, Mr. Rosen has presented no reasonable basis to justify such extraordinary returns.

²¹² RE-5, Chodorow Report I, ¶ 160.

²¹³ Rosen Reply Report, ¶ 2.7.

Figure 10: Total Returns for Martin Marietta and Vulcan vs. Rosen Valuation of BNS



Source: Chodorow Rejoinder Appendix F, Tables F.19 through F.20.

156. Mr. Rosen assumes that it would be reasonable to expect such excessive returns for BNS compared to publicly traded aggregates producers.²¹⁴ The rationale he provides is that private companies can have materially different profitability than publicly traded companies. To support this assertion, Mr. Rosen relies upon the opinion of the Claimants' expert, Mr. George Seamen, stating that return on investment ("ROI") is much higher for private aggregates producers, like BNS.
157. The profit margins referred to by Mr. Rosen and Mr. Seamen and discussed above measure a firm's profits as a percent of revenue.²¹⁵ ROI is an accounting measure of investment returns calculated by dividing a company's earnings by its invested capital. Mr. Rosen relies upon Mr. Seamen's claim that: "while the ROI reflected in the published earnings of Martin Marietta may be in the range of 30%, it is not unusual in my experience for the ROI of individual well-run privately-owned quarries, especially modern, well designed,

²¹⁴ Rosen Reply Report, ¶ 5.54.

²¹⁵ Rosen Reply Report, ¶ 5.53; and Seamen Reply Report, pp. 1-2.

automated, and efficient quarries, to be in the 60-75% range.”²¹⁶ If, as Mr. Rosen and Mr. Seamen claim, the ROIs for private companies are materially higher than those of publicly traded aggregates producers, it may be reasonable to expect the much higher returns that Mr. Rosen’s analysis implies BNS would have earned.

158. However, the opinion of Mr. Seamen, relied upon by Mr. Rosen, is unreasonable. First, Mr. Seamen’s opinion does not cite to any research or present any data or analysis to support its assertion that ROIs for Whites Point should be more than double those of publicly traded aggregates producers. Without any such support on the performance of private aggregates companies, it is not possible to evaluate the veracity of Mr. Seamen’s claim relied upon by Mr. Rosen.
159. Second, the information or assumptions upon which Mr. Seamen bases his conclusions is flawed. Mr. Seamen states that “the ROI reflected in the published earnings of Martin Marietta may be in the range of 30%...”²¹⁷ Figure 11 compares the ROI that Mr. Seamen argues is reasonable for Whites Point to Martin Marietta’s historical ROI for each year from published financial reports since the company was first incorporated.²¹⁸ In no year did Martin Marietta ever achieve ROIs in the range of 30%—the highest ROI was never more than 15%, and the average over this 24-year period was only 8.0%.²¹⁹ Mr. Seamen relies on flawed data and is incorrect about even the typical level of ROIs for aggregates producers. No reliable conclusions can follow from that analysis.

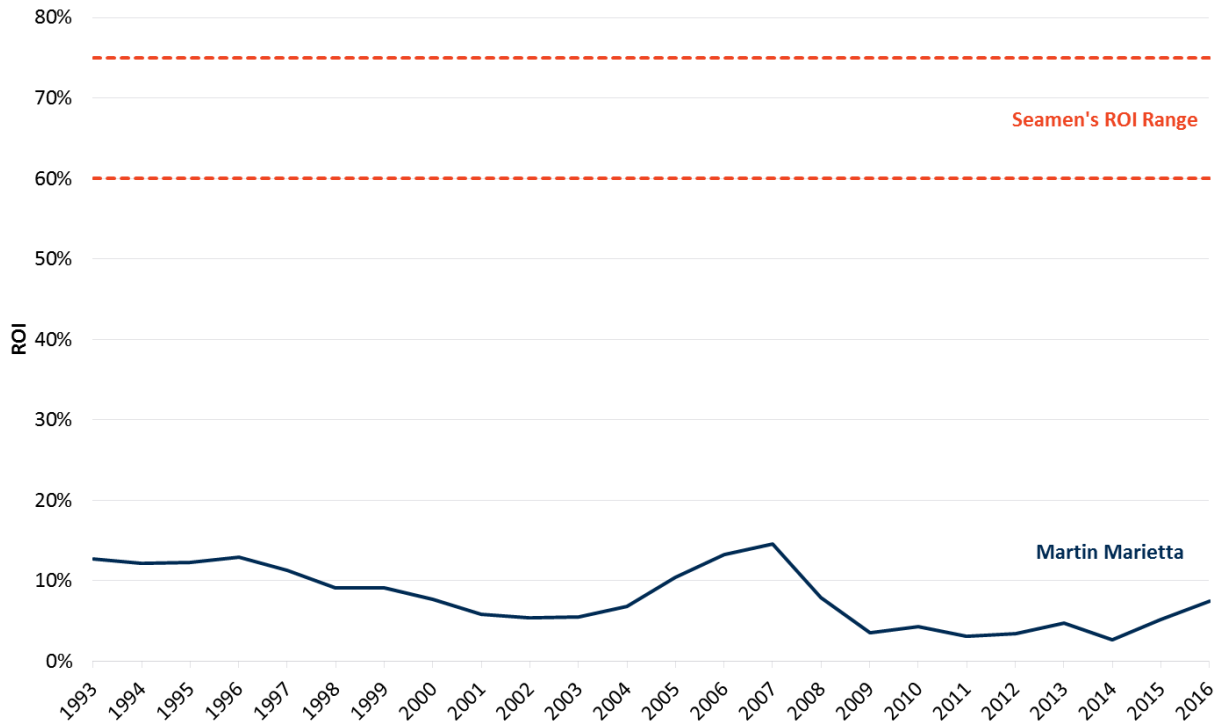
²¹⁶ Rosen Reply Report, ¶ 5.54; and Seamen Reply Report, p. 4.

²¹⁷ Seamen Reply Report, p. 4.

²¹⁸ Seamen Reply Report, p. 4. Martin Marietta was first incorporated in 1993 and first publicly listed in 1994. See **R-807**, “Company History,” Martin Marietta Materials, accessed 3 November 2017, <https://www.martinmarietta.com/about-us/company-history/>.

²¹⁹ Chodorow Rejoinder Appendix F, Table F.14.

**Figure 11: Assumed Whites Point ROI vs. Martin Marietta
FY 1993 – FY 2016**



Source: Data from Compustat Research Insight, accessed 30 October 2017.

Notes: ROI is calculated by Research Insight as Income Before Extraordinary Items - Available for Common, divided by Total Invested Capital, which is the sum of the following items: Total Long-Term Debt; Preferred Stock; Minority Interest; and Total Common Equity. See Chodorow Rejoinder Appendix F, Table F.14.

160. In short, the opinion of Mr. Seamen that Mr. Rosen relies upon to support his assumption that extraordinary returns are reasonable is flawed and unsupported.

VI. Mr. Rosen's Valuation Does Not Measure the Claimants' Loss as a Result of the Breach

161. Mr. Rosen has calculated damages based on a value of Whites Point as of the award date. This calculation does not measure the Claimants' loss as a result of the breach. I am instructed that the relevant loss is the Claimants' loss as of the breach date. Moreover, Mr. Rosen's analysis fails to account for the opportunity to mitigate losses. For these reasons, Mr. Rosen's valuation of Whites Point does not measure the Claimants' loss.

A. VALUATION OF THE PROJECT AS OF THE AWARD DATE OVERSTATES THE CLAIMANTS' LOSS AS OF THE BREACH DATE

162. Mr. Rosen's calculation of damages is an *ex-post* analysis based on the value of Whites Point as of the assumed award date of 31 December 2016. The calculation reflects the sum

of what Mr. Rosen estimates to be the past lost profits from 2008 to 2016 plus the future lost profits from 2017 through 2061 (although sales and production cease in 2060).

163. I have been instructed by counsel for the Respondent that the relevant legal standard for calculating damages here is one which would make the Claimants whole as of the breach date—an *ex-ante* analysis.
164. The use of this standard is economically efficient if this Tribunal finds that lost profits can be estimated reliably. Such a standard would make a claimant whole as of the breach date. Valuing the loss on the breach date simultaneously awards a claimant the expected loss as a result of the breach and relieves a claimant of any future risk associated with those potential lost profits. Thus, the claimant is made whole as of the date of the breach. Damages equal to the loss as of the breach date remove the incentive for respondents to act opportunistically in choosing a favorable valuation date.
165. The Claimants' Reply Memorial argues that the Claimants should have the right to the higher of damages on the breach date or the award date.²²⁰ I offer no view or expertise on the legal merits of such an argument.
166. As an economic matter, the potential for claimants to seek the *higher* of *ex-ante* or *ex-post* damages can create socially adverse incentives that lead to over-compensation from the arbitration system overall. Claimants who are relieved of risk as of the breach date would be protected from an adverse resolution of that risk in the future by valuing the loss on the breach date. However, where risk ultimately is resolved favorably, the claimant would have an incentive to select a valuation date as of the award date, benefiting from the resolution of that risk without having borne that risk. Thus, while Mr. Rosen claims that his "approach [...] avoids potential hindsight issues as all available information can be included in [his] analysis,"²²¹ it may actually enhance the problem of hindsight by allowing claimants to select which valuation date to pursue.
167. Mr. Rosen also states that "[a] current date analysis allows experts to incorporate actual market data available up to the effective date of the report rather than attempting to artificially create a proxy for the market outlook as of the breach date."²²² Mr. Rosen's *ex-*

²²⁰ Claimants' Reply Memorial, ¶¶ 34-36.

²²¹ Rosen Reply Report, ¶ 3.8.

²²² Rosen Reply Report, ¶ 3.8.

post approach does not eliminate the need to forecast market outlook beyond the valuation date—it simply does so as of a different date. Rather than developing a market outlook as of the breach date, Mr. Rosen relies on an assumed market outlook for the period from 2017 to 2060.²²³ As I have discussed above, Mr. Rosen’s market outlook as of the award date lacks any economic analysis of the actual market outlook that exists, as it just assumes that all prices and unit costs simply move with inflation until 2060. Thus, Mr. Rosen’s *ex-post* approach does not avoid the need for a DCF analysis to rely on an assumed market outlook—it just uses an outlook from a different date.

B. MR. ROSEN’S ANALYSIS OVERSTATES THE CLAIMANTS’ LOSSES BECAUSE IT IGNORES MITIGATION OPPORTUNITIES

168. Mitigation is an important economic consideration in assessing damages. Mr. Rosen values Whites Point as if the Project was fully expropriated. This approach ignores the impact of opportunities the Claimants had to mitigate damages.²²⁴ As described in my first report, I understand that the Claimants could have sought to mitigate the effects of the breaching JRP by pursuing a judicial review. Pursuit of a successful judicial review may have allowed the Claimants to construct Whites Point, albeit with some delay and added procedural costs.²²⁵ If the Project would have received the necessary approvals and permits but for the breach, the result would be a delayed, and somewhat more expensive quarry project, but not the total loss of Whites Point reflected in Mr. Rosen’s damages analysis.
169. The Rosen Reply continues to assess damages using its expropriation-style methodology, ignoring any potential for mitigation. Mr. Rosen’s basis for ignoring mitigation is a legal instruction that seeking a judicial review was neither appropriate nor reasonable.²²⁶ Mr. Rosen cites to the testimony of the Claimants’ expert Dean Sossin that it would be unreasonable to pursue judicial review because: (1) it would have precluded a NAFTA remedy; and (2) it would have returned the Claimants to a process that already had an unfair and inequitable result.²²⁷ Mr. Rosen also suggests, based on statements from Mr.

²²³ Rosen Reply Report, Schedule 1.

²²⁴ **RE-5**, Chodorow Report I, ¶ 104.

²²⁵ **RE-5**, Chodorow Report I, ¶¶ 193,195, and 198.

²²⁶ Rosen Reply Report, ¶ 3.17.

²²⁷ Rosen Reply Report, ¶¶ 3.13-3.15; and Reply Expert Opinion of Lorne Sossin, 3 August 2017, ¶¶ 57-60.

Buxton, that the assumptions about the cost and time for a second JRP process would be greater than those assumed in my analysis.²²⁸

170. With respect to mitigation, I was instructed by counsel for Canada to assume that:
- a. The Claimants had available to them a domestic remedy to correct the breach through the judicial review process;
 - b. It was appropriate and reasonable for the Claimants to pursue mitigation through this domestic remedy;
 - c. The pursuit of mitigation would not have precluded the Claimants from seeking treaty remedies; and
 - d. The Claimants failed to pursue any mitigation.
171. Mitigation is an essential element for a reliable assessment of economic loss. As I discuss in my first report, the economic impact of mitigation for the Whites Point project is substantial.²²⁹
172. As a matter of economics, mitigation is an important consideration in the economic assessment of damages. For example, the Reference Manual on Scientific Evidence published by the U.S. Federal Judicial Center states that:
- [A] party may not recover for losses it could have avoided, and is often expressed by stating that the injured party has a duty to mitigate, or lessen, its damages. The economic justification for the mitigation rule is that the injured party should not cause economic waste by needlessly increasing its losses.²³⁰
173. The pursuit of mitigation by the Claimants would have been reasonable for a number of reasons. First, I understand that the Claimants had a clear route to pursue mitigation through a judicial review. As asserted by Judge Evans, “[t]here is no question that the JRP’s Report and recommendations were subject to review in Canadian courts.”²³¹
174. Second, the cost of mitigation would have been low relative to the damages being sought by the Claimants. As discussed in my first report, I have been instructed that the added procedural costs of a judicial review and second JRP process would have been

²²⁸ Rosen Reply Report, ¶ 3.16.

²²⁹ RE-5, Chodorow Report I, Section VII.

²³⁰ R-808, *Reference Manual on Scientific Evidence*, Third Edition, Federal Judicial Center 2011, Chapter VII – Limitations on Damages, p. 464-465.

²³¹ RE-6, Expert Report for the Damages Phase of the Arbitration by the Honourable John M. Evans, 9 June 2017, ¶ 64.

approximately US\$1.2 million and would have delayed the start of Whites Point operations by approximately 4 years.²³² In the context of Mr. Rosen's lost profits estimate of US\$308 million, total damages of US\$459 million, and the Project's 50-year operating life, these impacts are relatively small.²³³ As a result, the overall economic cost of delay would have been small relative to the damage amounts claimed by Mr. Rosen.²³⁴

175. Third, the Claimants assert that Whites Point was strategically important to their larger business over the long term. For example, Mr. William Clayton Jr. stated that "[o]ur goal from the outset of our interest in the Whites Point Quarry was to control our own long-term supply of high quality aggregate."²³⁵ The Claimants had an alternative supplier that could supply [REDACTED] during the delay.²³⁶ Thus, if Whites Point had strategic importance over the long term as the Claimants assert, the judicial review offered the Claimants a means to prevent the loss of Whites Point while still allowing [REDACTED] access to aggregates supplies during the delay.
176. Finally, the cost of efforts to mitigate damages caused by the Respondent's breach is an economically reasonable component of the Claimants' loss, and I have explicitly included the costs associated with mitigation efforts as a component of damages in my first report.²³⁷

C. MR. ROSEN'S THEORY OF PRE-AWARD INTEREST IS FLAWED

177. I have been instructed by counsel for Respondent that pre-award interest is not legally appropriate in this proceeding.
178. Mr. Rosen calculates pre-award interest, stating that "[p]re-award interest compensates the Investors for...the opportunity costs associated with not having access to the funds as at the

²³² RE-5, Chodorow Report I, ¶¶ 196-198.

²³³ Rosen Reply Report, ¶¶ 2.7 and 5.6.

²³⁴ Aside from the added procedural costs, there would have been a delay in completing the Project. RE-5, Chodorow Report I, ¶¶ 195-198. Most of the profits that Mr. Rosen's analysis treats as lost would merely have been delayed.

²³⁵ Clayton Reply Statement, ¶ 12.

²³⁶ [REDACTED] 1025, Supply Agreement Between NYSS and Martin Marietta Materials, 24 May 2010, p. 17.

²³⁷ RE-5, Chodorow Report I, ¶ 199.

date of the lost cash flows.”²³⁸ There can be two sides to any such calculation when calculating damages on *ex-post* basis, as Mr. Rosen has done. A breach may deprive a claimant of access to funds in some pre-award years, but provide a claimant with *more* investable cash in other pre-award years.²³⁹ An economically sound calculation of pre-award interest would consider both effects on the claimant.

179. Mr. Rosen’s estimates of past cash flows include both effects on the Claimants but his pre-award interest calculation does not. He finds that Claimants avoided the need to spend large sums to construct Whites Point from [REDACTED], but would have generated positive cash flows from [REDACTED]. Mr. Rosen starts to apply pre-award interest only once the *cumulative* net cash flows become positive in [REDACTED].²⁴¹ Mr. Rosen’s approach neglects that the Claimants would have benefitted from having large sums of extra cash that might have otherwise been used to construct the Project between 2008 and 2010 but for the breach. His rationale for doing so is that “[i]t is unreasonable to calculate pre-award interest for periods where no actual damages are being claimed.”²⁴² However, this rationale is conceptually unsound. Cash flows from 2008 to 2016 are all part of Mr. Rosen’s estimate of pre-award lost profits, so a pre-award interest calculation should reflect the change in the Claimants’ cash position across each of those years, whether positive or negative.
180. Table 5 presents an example illustrating the flaw in Mr. Rosen’s netting approach. The example is an *ex-post* damages calculation for a business that would have had a cash outflow of \$1,000 in Year 1 for capital expenditures (“capex”), a cash inflow of \$1,250 of profits in Year 2, and payment of an award equal to \$250 (\$1,250 profit - \$1,000 capex) in Year 3 before pre-award interest. Assuming an interest rate of 10% per annum and ignoring compounding for simplicity,²⁴³ the claimant lost the opportunity to earn \$125 in interest by investing the \$1,250 in lost profits from Year 2 to Year 3. However, the claimant gained the opportunity to earn \$200 in interest because it was able to invest the \$1,000 from Year 1 to Year 3 rather than spending it on capex. While the claimant still

²³⁸ Rosen Report I, ¶ 7.2.

²³⁹ This would be unlikely to occur when damages are calculated on an *ex-ante* basis.

²⁴⁰ Rosen Reply Report, Schedule 1.

²⁴¹ Rosen Reply Report, Schedule 13.

²⁴² Rosen Reply Report, ¶ 7.5.

²⁴³ Compounding is standard practice, but I ignore it in this illustration it here for simplicity.

incurred \$250 in damages, it actually experienced a pre-award interest benefit of \$75 (\$200 benefit - \$125 cost). Mr. Rosen’s netting method would ignore the \$200 interest benefit altogether and just calculate pre-award interest on the net damages (i.e., the \$250) from Year 2 to Year 3. Thus, Mr. Rosen’s method would add to the \$250 damages award a request for \$25 in pre-award interest, despite the fact that the claimant actually received a pre-award interest benefit of \$75 that offset part of the \$250 in damages. While Mr. Rosen argues that basing the pre-award interest calculation on the actual cash flow effects would “calculate pre-award interest for periods where no actual damages are being claimed,”²⁴⁴ it actually captures both the harmful and beneficial effects of the but-for cash flows to the injured party.

Table 5: Interest Earned on Cash Excess (Deficit) vs. Rosen Cumulative Approach

		Actual Cash Flow Approach		Rosen Approach
		Capex (year 1)	Profit (year 2)	Net Cash Flow (year 2)
Cash Excess (Deficit)	[1]	\$1,000	(\$1,250)	(\$250)
Interest rate	[2]	10%	10%	10%
Annual Interest Earnings	[3]	\$100	(\$125)	(\$25)
Years of Interest to Present	[4]	2	1	1
Interest Earned (Foregone)	[5]	\$200	(\$125)	(\$25)
Total Interest Earned (Foregone)	[6]		\$75	(\$25)

Notes:

[1]: Excess (deficit) cash flows from each year are netted in Mr. Rosen’s approach. Positive values reflect extra cash available to the claimant and negative values reflect a reduction in cash available.

[2]: Assumes an annual interest rate of 10% with no compounding for simplicity.

[3]: [1] x [2].

[4]: Years of interest until the award date.

[5]: [3] x [4], ignores compounding for simplicity.

[6]: For the actual cash flow method, the sum of [5] for both cash flows, Capex and Profit. For Mr. Rosen’s method, [6] equals [5].

181. As I noted in my first report, a pre-award benefit for the Claimant that would result from adopting Mr. Rosen’s analysis is atypical and results from the particular circumstances surrounding his *ex-post* damages assessment. While this outcome is atypical, the approach recommended in my first report is economically appropriate where there is a legal basis for pre-award interest. Adopting Mr. Rosen’s approach compensates the Claimants for harm that they did not incur. I have prepared a revised pre-award interest calculation to reflect

²⁴⁴ Rosen Reply Report, ¶ 7.5.

changes in the lost profits analysis in the Rosen Reply Report. The Claimants would have had a pre-interest benefit of approximately US\$379,000 based on Mr. Rosen's revised analysis.²⁴⁵

VII. The Value of Potential Whites Point Profits But-For the Breach

182. In my first report, Respondent's counsel asked me to prepare an alternative DCF valuation of Whites Point immediately prior to the breach. In preparing this valuation, I was instructed to assume that the Project faced permitting risk even absent the breach. This analysis incorporated assumptions of how Whites Point would operate based on expectations that existed at the time with respect to Project life, annual production volume, and shipment volumes. I also incorporated Mr. Rosen's assumptions with regard to certain inputs, such as product mix and various costs. Using this DCF model, I estimated that the value of Whites Point at the time was US\$8.7 million.²⁴⁶ This conclusion was in reasonable proximity to the range of the market value indicators for Whites Point indexed to the breach date.
183. In preparing this breach-date valuation, I relied upon certain assumptions provided by the Respondent's other experts, Marsoft and SCMA. These experts have made revisions in their rejoinder reports. Marsoft has revised its projection of freight rates.²⁴⁷ SCMA has revised its estimate of maintenance costs for the Whites Point marine terminal components.²⁴⁸ I have adjusted my DCF valuation of Whites Point as of the breach date to account for these revisions. The resulting valuation is US\$6,333,825, as reflected in the revised DCF analysis in Appendix D to this report.²⁴⁹ As with my prior DCF valuation, this updated value is in reasonable proximity to the range of market value indicators for Whites Point indexed to the breach date.
184. As I discuss in my first report, this DCF valuation of Whites Point does not consider permitting risk, which is outside of my expertise. This valuation could be adjusted for

²⁴⁵ Chodorow Rejoinder Appendix F, Table F.22.

²⁴⁶ **RE-5**, Chodorow Report I, ¶ 178.

²⁴⁷ **RE-15**, Expert Rejoinder Report of Marsoft Inc., November 6, 2017, ¶¶ 54-57.

²⁴⁸ **RE-16**, SCMA Rejoinder Report, ¶ 50.

²⁴⁹ Chodorow Rejoinder Appendix D, Table D.1.

permitting risk using the methodology that I describe in my first report.²⁵⁰ It is also the case that this valuation of Whites Point does not reflect my opinion on the damages to the Claimants resulting from the breach because it does not account for the Claimants' ability to mitigate the effects of the breach, as I discuss in my first report and below.²⁵¹

VIII. The BNS Loss Accounting for Claimants' Mitigation Opportunity

185. As I describe in my first report, Mr. Rosen calculates expropriation-style damages that ignore any potential for mitigation. I was instructed that the Claimants had the opportunity to mitigate their loss by appealing the breach through the Canadian judicial review process. The opportunity to mitigate could have allowed the Claimants to reverse most of the effects of the breach and potentially operate Whites Point albeit with a delay. While BNS was still damaged by the breach, the resulting loss was lower than the full value of the Project.²⁵²
186. Mr. Rosen does not address the issue of mitigation in his first report. However, Mr. Rosen was provided for his reply report with a new instruction from counsel that mitigation should not be considered in calculating damages. I am instructed that the Claimants' legal position is incorrect.
187. Mitigation is a fundamental aspect of an economically sound quantification of economic damages. In the case of Whites Point, the Claimants could have pursued the judicial review process to counter the effects of the breach. If, as discussed above, Whites Point had important strategic value to the Claimants, mitigation through the judicial review would have allowed the Claimants the opportunity to retain access to what they have stated was a strategically important asset.
188. As discussed in my first report, mitigation would involve additional procedural costs and would have delayed the start of the project. I have re-evaluated my estimate of economic loss to the Claimants accounting for mitigation based on the revised projection of freight costs from Marsoft and the adjusted maintenance costs from SCMA as noted above. Consistent with the my first report, I find that deferring the start of commercial operations

²⁵⁰ RE-5, Chodorow Report I, ¶¶ 186-192.

²⁵¹ RE-5, Chodorow Report I, ¶ 157.

²⁵² RE-5, Chodorow Report I, ¶¶ 193-200.

while the Claimants pursued mitigation would not have reduced the value of Whites Point as of the breach date because the deferral would allow time for the freight market to ease, reducing the cost of acquiring long-term vessel capacity to provide aggregates deliveries for the Project. Therefore, the harm from the breach would have been limited to the added procedural costs necessary to pursue judicial review and obtain a non-breaching JRP report. I estimate these costs to be US\$1,151,046, which reflects the damages to BNS after accounting for mitigation.²⁵³



Darrell Chodorow
Washington, DC
6 November 2017

²⁵³ RE-5, Chodorow Report I, ¶ 197.

Appendix A: Resume

Washington, DC

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Darrell.Chodorow@brattle.com

Mr. Darrell Chodorow is a principal in the Washington, DC office of The Brattle Group. He has more than twenty years of consulting experience in commercial damages, valuation, and tax matters with The Brattle Group. His work has covered a broad array of industries including oil, natural gas, and electricity; biotechnology, pharmaceuticals, and chemicals; commodities and financial services; gaming; consumer products; high technology and media; and transportation.

His expertise includes developing practical insights from detailed analyses of complex business and financial contracts in the context of damages quantification, asset valuation, and the evaluation of economic substance underlying transactions. Mr. Chodorow was identified as a leading expert witness in arbitration, in quantum of damages, and in construction quantum and delay by the Who's Who Legal Consulting Experts Guide.

Commercial Damages: Mr. Chodorow provides testimonial and non-testimonial consulting on damages in breach of contract, intellectual property, antitrust, and other matters. He has acted as an expert in cases before U.S. state and federal courts, the U.S. Tax Court, and the District Court of Cyprus, as well as arbitrations before AAA, ICSID, ICC, LCIA, PCA, and ad hoc tribunals.

Business and Asset Valuation: Mr. Chodorow has valued businesses, financial assets, and business assets in litigation and non-litigation matters. He has conducted valuations in a variety of industries including agricultural products, cement, chemicals, financial products, gaming, petroleum, and electricity.

Tax Disputes: Mr. Chodorow has advised the Internal Revenue Service, the U.S. Department of Justice, and taxpayers on matters related to economic substance, research tax credits, transfer pricing, and asset valuation. Cases related to economic substance include BLIPS, Son of Boss, CARDS, DAD, STARS, short-sale, and leasing transactions.

In addition to authoring expert reports and testifying, Mr. Chodorow has worked closely with a number of leading economic and finance academics. They include University of California at Berkeley Professor Daniel McFadden, winner of the 2000 Nobel Prize in Economic Sciences; Massachusetts Institute of Technology Professor Stewart Myers, author of the world's leading corporate finance textbook; and Ohio State University Professor René Stulz, former president of the American Finance Association.

Prior to joining Brattle, Mr. Chodorow was an associate in the Energy, Chemicals and Pharmaceuticals group of Booz Allen & Hamilton and at Global Petroleum clearing trades in the futures trading room. He received a B.A. in economics from Brandeis University and an M.B.A. from the Yale School of Management, where he was invited to be a teaching assistant for courses in financial accounting, decision making, and economics.

REPRESENTATIVE EXPERIENCE

Commercial Damages – U.S. Federal and State Courts

- Mr. Chodorow provided expert testimony assessing the damages analysis underlying the request for a \$50 million bond in a Lanham Act matter.
- In a lawsuit alleging predatory conduct by a market research provider, Mr. Chodorow submitted an expert report in federal court estimating damages to the plaintiff.
- Mr. Chodorow submitted an expert report on damages in a case involving alleged patent infringement in the biotechnology industry.
- In a matter alleging collusion among financial products providers, Mr. Chodorow evaluated the excess profits earned as a result of the alleged collusion.
- On behalf of a pest control company, he submitted an expert report estimating damages arising from the alleged breach of a distribution agreement and patent infringement.
- For an industrial products company, Mr. Chodorow submitted an expert report on damages in a dispute over a distribution agreement and the accompanying option to purchase the supplier.
- In a lawsuit over an exclusive pharmaceutical distribution agreement for the Former Soviet Union, Mr. Chodorow testified on the reliability of a damages claim in excess of \$300 million arising from the supplier's alleged breach of contract.

Commercial Damages – Arbitration Proceedings

- *Permanent Court of Arbitration in The Hague*: On behalf of a minority shareholder in a major financial institution, Mr. Chodorow worked with Professor Stewart Myers to critique the valuation methodologies used to determine the price applied in a mandatory share repurchase.
- *International Centre for the Settlement of Investment Disputes*: Mr. Chodorow estimated damages to foreign investors relating to alleged violations of Chapter 11 of NAFTA by the United Mexican States through the imposition of a tax on high-fructose corn syrup.
- *Arbitration Institute of the Stockholm Chamber of Commerce*: He estimated damages arising from an alleged violation of a license agreement granted to a Chinese chemical manufacturer.

- *London Court of International Arbitration:* Mr. Chodorow evaluated the economic factors surrounding the alleged breach of a crude oil supply agreement between a large buyer and a state-owned oil company.
- *ICC International Court of Arbitration:* He conducted an assessment of the implementation of a valuation clause in a cross-border joint venture agreement involving the beverage industry.
- *American Arbitration Association:* Mr. Chodorow provided expert testimony on issues relating to market timing, directed brokerage, and damages in the mutual fund industry.

Valuation Matters

- In the oil & gas industry, Mr. Chodorow has:
 - Advised a board of directors on the valuation impact of a proposed refinery upgrade.
 - Evaluated the reliability of the methodology and conclusions reached in an appraisal of a multi-billion dollar petroleum refining and marketing business.
 - Valued crude oil reserves and assessing the impact of changes in prices on reserve values.
 - Assessed the loss in value arising from a proposed injunction on the start of production for a coalbed methane project.
 - Valued lease interests in the Marcellus shale.
 - Analyzed the value of liquefied natural gas (LNG) sale and purchase agreements.
- In a dispute over a gaming license in an Asian market, he valued the gaming business resulting from a multi-billion dollar investment program relying on the license.
- Mr. Chodorow advised on the fair market value of the assets during negotiations over the sale of a controlling stake in a large cement, aggregates, and ready-mix concrete business.
- For an entrepreneur considering the purchase of hydroelectric generating assets, Mr. Chodorow estimated the fair market value of the target assets.
- Mr. Chodorow advised a client on the valuation of online gaming assets that generated net gaming revenues of nearly \$1 billion per year.
- On behalf of a potential acquirer, he assisted in the valuation of transmission assets being offered for sale by a vertically-integrated electric utility.
- Mr. Chodorow has valued a wide variety of financial instruments.

Tax Matters

- In *Roy E. Hahn and Linda G. Montgomery v. Commissioner of Internal Revenue*, Mr. Chodorow testified on the potential for economic profit and non-tax business purpose of the CARDS transaction.
- For both the U.S. Government and taxpayers, Mr. Chodorow has evaluated issues related to economic substance and business purpose for transactions including: BLIPS (*Klamath Strategic Investment Fund LLC v. U.S.*); “Son of Boss” (*United States v. Woods*); CARDS (*Country Pine Finance, LLC v. Commissioner of Internal Revenue*); Distressed Asset/Debt (*Southgate Master Fund LLC. W. United States*); STARS (*Salem Financial Inc. v. United States*); and sale-leaseback transactions.
- In a variety of matters, Mr. Chodorow advised clients on transfer pricing issues both for advance pricing agreements and in the course of litigation. Industries analyzed include liquefied natural gas, mining, commodities trading, insurance, and pharmaceuticals.
- In multiple cases, Mr. Chodorow assessed the reasonableness of claimed valuations of performing and non-performing debt instruments.
- Mr. Chodorow submitted an expert report valuing crude oil reserves worth nearly \$1 billion in a tax basis dispute and presented before an IRS Appeals panel.
- On behalf of a taxpayer, Mr. Chodorow evaluated whether a company bore the economic benefits and burdens of research costs for which it claimed research tax credits.
- In multiple cases, Mr. Chodorow has evaluated the economic reasonableness of a taxpayers’ claimed tax treatment of hedging transactions conducted using exotic derivatives.
- Mr. Chodorow advised a promoter of alleged abusive tax shelters on potential damages in a class action lawsuit by its customers.

PUBLICATIONS AND PRESENTATIONS

“An Economic Evaluation of ‘Funding’ for Research Tax Credits”, (with S. Ledgerwood). *Tax Notes*, Volume 144, Number 13 (September 29, 2014): 1593.

Credit, Where Credit is Due: An Economic Approach to Evaluating the Issue of “Funding” in Research Tax Credit Claims, (with S. Ledgerwood), February 2014.

“The BP Royalty Trust: Warning of Impending Price Declines or a Failing Economic Indicator,” Notes at the Margin, (with P. Verleger), September 2012.

“The Economic Implications of the Texas Waiver on Petroleum Markets and the Broader Economy,” (with P. Verleger), June 2008.

University of Virginia School of Law, Guest Lecturer in Regulation and Deregulation of U.S. Industries, February 2008.

“Standards for Consulting Firms Working with Academic Experts,” presented at Law Seminars International’s Expert Testimony in Litigation Conference, Reston, VA, December 2004.

“The FERC, Stranded Cost Recovery, and Municipalization,” *Energy Law Journal*, Vol. 19 (2), pp. 351-386. (with others).

“Stages of Power Plant Development – A Survey,” (with F. Graves), presented at “*Boom-Bust*” in the *Electric Power Industry*, Cambridge, MA, August 2000.

“What’s in the Cards for Distribution Companies,” (with P. Hanser and J. Pfeifenberger), presented at *The Electricity Distribution Conference*, Denver, CO, April 1998.

“Distributed Generation: Threats and Opportunities,” (with P. Hanser and J. Pfeifenberger), presented at *The Electricity Distribution Conference*, Denver, CO, April 1998.

TESTIMONY AND EXPERT REPORTS

Agrizap, Inc. v. Woodstream Corp., et al., U.S. District Court, Eastern District of Pennsylvania. Civil Action No. 04-3925. Expert Report.

Bilcon of Delaware Inc. et al v. Government of Canada, Permanent Court of Arbitration CA Case No. 2009-04. Expert Report.

City of Ontario v. City of Los Angeles, Los Angeles World Airport, and Los Angeles Board of Airport Commissioners, Superior Court of California. Case No. RIC 1306498. Expert Report and Deposition Testimony.

Confidential AAA arbitration involving the mutual fund industry (New York). Expert Report, Deposition Testimony, and Testimony.

Confidential ICC arbitration of alleged misrepresentations in a cosmetics industry acquisition (Singapore). Expert Report and Testimony.

Confidential ICC arbitration relating to the construction contract for a hydroelectric dam in Central America (New York). Expert Report and Rebuttal Report.

Confidential LCIA arbitration regarding the delivery of allegedly defective solar modules (Singapore). Expert Report.

Confidential tax mediation over the value of crude oil reserves. Expert Report and Presentation to IRS Appeals Panel.

Coverings Space NJ, Inc. v. Adele, et al., Superior Court of New Jersey. Civil Action HUD-L-3730-06. Expert Report and Deposition Testimony.

Embrex, Inc. v. Avitech, L.L.C. U.S. District Court, Middle District of North Carolina. Civil Action No. 1:04CV00693. Expert Report.

Enel Green Power S.p.A. v. Republic of El Salvador, International Centre for Settlement of Investment Disputes, Case No. ARB/13/18. Expert Report.

ErinMedia, LLC v. Nielsen Media Research, Inc., U.S. District Court, Middle District of Florida. Civil Action No. 8:05-CV-1123-T24-EAJ. Expert Report and Deposition Testimony.

Hydro-Fraser Inc., Société d'énergie Columbus Inc., Ayers Ltée v. Hydro Québec, ad hoc arbitration. Expert Report, Rebuttal Report, and Hearing Testimony.

Kayat Trading Ltd. v. Genzyme Corporation, Cyprus District Court, Nicosia District. Expert Report and Testimony.

Laboratorios Haymann S.A. v. Ivax Pharmaceuticals, Inc. and Teva Pharmaceuticals USA, Inc., International Chamber of Commerce International Court of Arbitration, Case No. ICC 18589/CA. Expert Report, Deposition Testimony, and Arbitration Testimony.

Norfolk Southern Railway Company v. Drummond Coal Sales, Inc., U.S. District Court, Western District of Virginia. Civil Action No. 7:08CV00340. Expert Report.

Perfetti Van Melle USA and Perfetti Van Melle Benelux v. Cadbury Adams USA LLC, U.S. District Court for the Eastern District of Kentucky, Civil Action No. 2:10-CV-35-DLB. Expert Declaration and Testimony.

Petroplast Petrofisa Plasticos S.A. and Petrofisa Do Brazil, Ltda v. Ameron International Corp., Delaware Court of Chancery, Civil Action No. 4304-VCP. Expert Report, Deposition Testimony, and Testimony.

Robert Rockwood and Roxanna Marchosky v. SKF USA, Inc. U.S. District Court for the District of New Hampshire, Civil Action No. 1:08-CV-00168. Expert Report.

Roy E. Hahn and Linda G. Montgomery v. Commissioner of Internal Revenue, U.S. Tax Court, Docket No. 1910-14. Expert Report and Testimony.

SCS Interactive, Inc. and Whitewater West Industries Ltd v. Vortex Aquatic Structures International Inc., U.S. District Court of Colorado, Civil Action No. 09-cv-01732-REB-KLM. Expert Report.

SoBe Entertainment International, LLC v. Paul Wight a/k/a "The Big Show," Bess Wight f/k/a Bess Katramados, and World Wrestling Entertainment, Inc., Circuit Court for Miami-Dade County, Case No. 09-45461 CA 09. Expert Declaration.

The Northern Cheyenne Tribe v. Gale A Norton, Secretary of the Interior and Fidelity Exploration and Production Company, U.S. District Court, District of Montana, Billings, Civil Action No. CV-03-00078-RWA. Expert Declaration.

Appendix B: Materials Considered

Documents Considered

1. Documents Produced by Claimants

Investors' Reply Damages Memorial, *William Ralph Clayton, William Richard Clayton, Douglas Clayton, Daniel Clayton and Bilcon of Delaware, Inc. v. Government of Canada*, 23 August 2017.

Expert Reply Report of Howard Rosen. 23 August 2017.

Expert Reply Report of Peter Oram. 17 August 2017.

Expert Reply Report of Mineral Valuation & Capital, Inc. (John Lizak). 8 August 2017.

Expert Reply Report of John T. Boyd Company (Michael Wick). 16 August 2017.

Expert Reply Report of Tamarack Resources (Wayne Morrison). 18 August 2017.

Expert Reply Report of Thorsteinssons LLP (Michael W. Colborne). 17 August 2017.

Expert Reply Report of SNC-Lavalin (Bill Collins). 14 August 2017.

Expert Reply Report of Mercator Geological Services (Michael Cullen). 1 August 2017.

Expert Reply Report of David Estrin. 20 August 2017.

Expert Reply Report of SNC-Lavalin (Christopher Fudge). 14 August 2017.

Expert Reply Report of SNC-Lavalin (Jussi Jaakkola). 11 August 2017.

Expert Reply Report of John D. McCamus. 14 August 2017.

Expert Reply Report of GS Management Inc. (George S. Seamen Jr.). 10 August 2017.

Expert Reply Report of Stephen E. Shay. 19 August 2017.

Reply Expert Opinion of Lorne Sossin. 3 August 2017.

Reply Witness Statement of George Bickford. 8 August 2017.

Reply Witness Statement of Paul Buxton. 18 August 2017.

Reply Witness Statement of William Richard Clayton. 21 August 2017.

Reply Witness Statement of Tom Dooley. 18 August 2017.

Reply Witness Statement of Joe Forestieri. 21 August 2017.

Reply Witness Statement of Dan Fougere. 18 August 2017.

Reply Witness Statement of John Wall. 18 August 2017.

Reply Witness Statement of LB&W Engineering (Michael G. Washer). 8 August 2017.

Expert Report of Howard Rosen. 15 December 2016.

Expert Report of Mercator Geological Services (Michael Cullen). 17 November 2016.

Expert Report of GHD (Peter Oram). 6 December 2016.

Expert Report of Mineral Valuation & Capital, Inc. (John Lizak). 30 November 2016.

Expert Report of John T. Boyd Company (Michael F. Wick). 5 December 2016.

Expert Report of GS Management Inc (George S. Seamen Jr). 10 August 2017.

Documents Considered

Witness Statement of Tom Dooley. 9 December 2016.

Witness Statement of Joe Forestieri. 13 December 2016.

C-5. Letter of Intent from Bilcon of Delaware, Inc. to Nova Stone Exporters Inc. March 28, 2002.

C-629. Whites Point Quarry and Marine Terminal Response Volume II.

C-1001. Crushing Plant Drawings and Schedule with George Bickford's Handwritten Notes, Revision D.

C-1010. Whites Point Operating Costs. 2011-2015.

C-1025. Supply Agreement Between NYSS and Martin Marietta Materials. 24 May 2010.

C-1026. NYSS Confidential Information Memorandum. January 2014.

C-1050. Amboy Aggregates Joint Venture Agreement.

C-1092. Vulcan Materials Company. Black Point Quarry Project Environmental Impact Statement. February 2015.

C-1095. FTI Native DCF Model. 15 December 2016.

C-1152. Stone (Crushed) Statistics. U.S. Geological Survey (1900-2014). 28 January 2016.

C-1169 through C-1318. Historical Cost Records.

C-1342. Letter from Gregory Nash re: Procedural Order No. 22. 10 March 2017.

C-1366. LB&W Engineering Inc. Revision D Plant Mass Flow Balance. 26 July 2017.

C-1447. Clayton Companies Financial Information, 2001 to 2016.

C-1542. Rosen Reply Report Native DCF Model. 23 August 2017.

CA-316. Gold Reserve Inc. v. Bolivarian Republic of Venezuela. ICSID Case No. ARB (AF)/09/1. 22 September 2014.

CA-317. Crystallex International Corporation v. Bolivarian Republic of Venezuela. ICSID Case No. ARB(AF)/11/2,

CA-345. Rusoro Mining Limited v. Bolivarian Republic of Venezuela. ICSID Case No. ARB(AF)/12/5, Award. 22

2. Documents Produced by Respondent

RE-1. Expert Report of Lesley Griffiths. 9 June 2017.

RE-2. Expert Report of Tony Blouin. 9 June 2017.

RE-3. Expert Report of Robert G. Connelly. 9 June 2017.

RE-4. Report of Peter Geddes. 9 June 2017.

RE-5. Expert Report of The Brattle Group. 9 June 2017.

RE-6. Expert Report of the Honourable John M. Evans. 9 June 2017.

RE-7. Expert Report of Dr. Arlie G. Sterling, Marsoft, Inc. 9 June 2017.

RE-8. Expert Report of SC Market Analytics. 9 June 2017.

RE-9. Expert Rejoinder Report of Lesley Griffiths. 6 November 2017.

RE-10. Expert Rejoinder Report of Tony Blouin. 6 November 2017.

Documents Considered

- RE-11.** Expert Rejoinder Report of Robert G. Connelly. 6 November 2017.
- RE-15.** Rejoinder Expert Report of Marsoft, Inc. 6 November 2017.
- RE-16.** Rejoinder Expert Report of SC Market Analytics. 6 November 2017.
- R-330.** Whites Point Quarry and Marine Terminal Project, Information Profile Bilcon of Nova Scotia Corporation.
- R-575.** Whites Point Quarry & Marine Terminal. Environmental Impact Statement, Volume I – Plain Language Summary. 31 March 2006.
- R-581.** Whites Point Quarry & Marine Terminal. Revised Project Description. November 2006.
- R-590.** Letter from ██████████, Inc. to William Clayton. ██████████
- R-717.** Business Plan for Whites Point Quarry. Clayton Concrete. April 2004.
- R-720.** Document Production Requests of the Government of Canada. 10 February 2016.
- R-724.** Continental Stone Limited. "Environmental Assessment Registration Document." Newfoundland and Labrador Department of the Environment and Conservation. October 2014. Accessed 1 November 2016.
- R-730.** Bloomberg USD/CAD forwards. Accessed 15 May 2017. Bloomberg LP.
- R-740.** Daily PX_LAST of CAD BGN Currency. 3 January 2000 – 23 February 2017. Accessed 23 February 2017.
- R-747.** Monthly HISTORICAL_MARKET_CAP, Monthly RT116, and Daily PX_LAST of MLM US Equity and VMC US Equity. 3 January 2000 - 21 February 2017. Accessed 12 May 2017. Bloomberg LP.
- R-798.** PPI Energy and Chemicals Team. "The Effects of Shale Gas Production on Natural Gas Prices." U.S. Bureau of Labor Statistics. *Beyond the Numbers 2*, no. 13. May 2013. Accessed 3 November 2017.
- R-799.** CPI Inflation Calculator. U.S. Bureau of Labor Statistics. Accessed 3 November 2017.
- R-800** McGuigan, James R. and R. Charles Moyer. *Managerial Economics*. Fourth Edition (St. Paul, MN: West Publishing Company, 1986).
- R-801.** Case, Karl E., Ray C. Fair, and Sharon M. Oster. *Principles of Microeconomics*. Ninth Edition (Upper Saddle River, NJ: Princeton Hall, 2009).
- R-802.** "Office of Materials and Testing Qualified Products List." Georgia Department of Transportation. 28 August 2017. Accessed 3 November 2017.
- R-803.** Detar, James. "Investors Love Vulcan Materials' Results Like A Rock." *Investor's Business Daily*. 5 July 2016. Accessed 3 November 2017.
- R-804.** Bodie, Zvi, et al. *Investments*. Ninth Edition. McGraw-Hill Irwin (2011).
- R-805.** Gaughan, Patrick A. *Measuring Business Interruption Losses and Other Commercial Damages*. Second Edition (John Wiley and Sons 2009).
- R-806.** Keown, Arthur and John Pinkerton. "Merger Announcements and Insider Trading Activity: An Empirical Investigation." *Journal of Finance*, Vol. 36, Issue 4 (Sep. 1981).
- R-807** "Company History." Martin Marietta Materials. Accessed 3 November 2017.
- R-808.** *Reference Manual on Scientific Evidence*. Third Edition. Federal Judicial Center (2011). Accessed 3
- R-809.** 2015 Advance Data Release of 2015 Annual Tables. U.S. Geological Survey. Accessed 3 November 2017.
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Appendix C: Historical Costs

**Table C.1: Total Historical Costs in Canadian Dollars
(Apr. 2002 - Oct. 2007)**

	Total Costs	BNS Total Costs	Substantiated Costs
[1] Consulting Experts	[REDACTED]	[REDACTED]	[REDACTED]
[2] Panel Costs	[REDACTED]	[REDACTED]	[REDACTED]
[3] Office & Operations	[REDACTED]	[REDACTED]	[REDACTED]
[4] 2004 GQP Purchase	[REDACTED]	[REDACTED]	[REDACTED]
[5] Total Investment Costs	[REDACTED]	[REDACTED]	[REDACTED]

Sources: Table C.5. [12], [14], [7], and Table C.6.

Notes: Total BNS Costs exclude cases [REDACTED]

Substantiated Costs exclude costs that were not deemed to have evidence of payment or [REDACTED]

Figures reported in US\$ are converted to C\$ using the month-end exchange rate for each invoice.

- [1]: Costs associated with consulting experts for the environmental assessment.
- [2]: Costs associated with the JRP Panel. This includes all payments to the Canadian Environmental Assessment Agency and the Nova Scotia Department of the Environment and Labour.
- [3]: Costs associated with the development of the quarry and business, excluding foreign withholding taxes.
- [4]: Claimants' payments to buy NSE's stake in GQP, converted to Canadian dollars.
- [5]: [1] + [2] + [3] + [4].

**Table C.2: JRP-Related EA Costs in Canadian Dollars
(Nov. 2004 - Oct. 2007)**

	Total Costs	BNS Total Costs	Substantiated Costs
[1] Consulting Experts	[REDACTED]	[REDACTED]	[REDACTED]
[2] Panel Costs	[REDACTED]	[REDACTED]	[REDACTED]
[3] Office & Operations	[REDACTED]	[REDACTED]	[REDACTED]
[4] Total Investment Cost	[REDACTED]	[REDACTED]	[REDACTED]

Sources: Table C.5 [12], [14], [7], and Table C.6.

Notes: Total BNS Costs exclude cases where [REDACTED]
 Substantiated Costs exclude costs that were not deemed to have evidence of payment or [REDACTED]
 Figures reported in US\$ are converted to C\$ using the month-end exchange rate for each invoice.

- [1]: Costs associated with consulting experts for the environmental assessment.
- [2]: Costs associated with the JRP Panel. This includes all payments to the Canadian Environmental Assessment Agency and the Nova Scotia Department of the Environment and Labour.
- [3]: Costs associated with the operation of the office during the JRP process, such as salaries, office supplies, and courier services. Non-essential costs, such as foreign withholding taxes, hats and mugs, are excluded from the JRP period tabulation.
- [4]: [1] + [2] + [3].

**Table C.3: Second JRP Cost Estimation in 2007 US Dollars
(May 2007 - Oct. 2007)**

	Costs in Canadian Dollars	Cost in US Dollars
[1] Consulting Experts	████████	████████
[2] Panel Costs	████████	████████
[3] Office & Operations	████████	████████
[4] Total	████████	████████

Sources: Table C.4, C.5 [12], [13] and Table C.6.

Notes: Amounts listed in C-1172, a duplicative file, are excluded.

- [1]: Costs associated with consulting experts for the environmental assessment.
- [2]: Table C.4.
- [3]: Costs associated with the operation of the office during the JRP process, such as salaries, office supplies, and courier servicers. Non-essential costs, such as foreign withholding taxes, hats and mugs, are excluded from the JRP period tabulation.
- [4]: [1] + [2] + [3].

Table C.4: Second JRP Panel Cost Estimation

Invoice Date	Cost in Nominal C\$	Exchange Rate	Cost in 2007 US\$
[1]	[2]	[3]	[4]
16-Sep-07	\$67,697	0.9923	\$68,222
27-Nov-07	\$232,080	0.9987	\$232,382
27-Mar-08	\$59,914	1.0253	\$58,435
Total	\$359,690		\$359,039

Source: CEAA Invoices.

Notes:

[1]: The date of the CEAA invoice.

[2]: The amount due to the CEAA, listed in Canadian dollars.

[3]: Table C.7.

[4]: [2] / [3].

Table C.5: Historical Costs

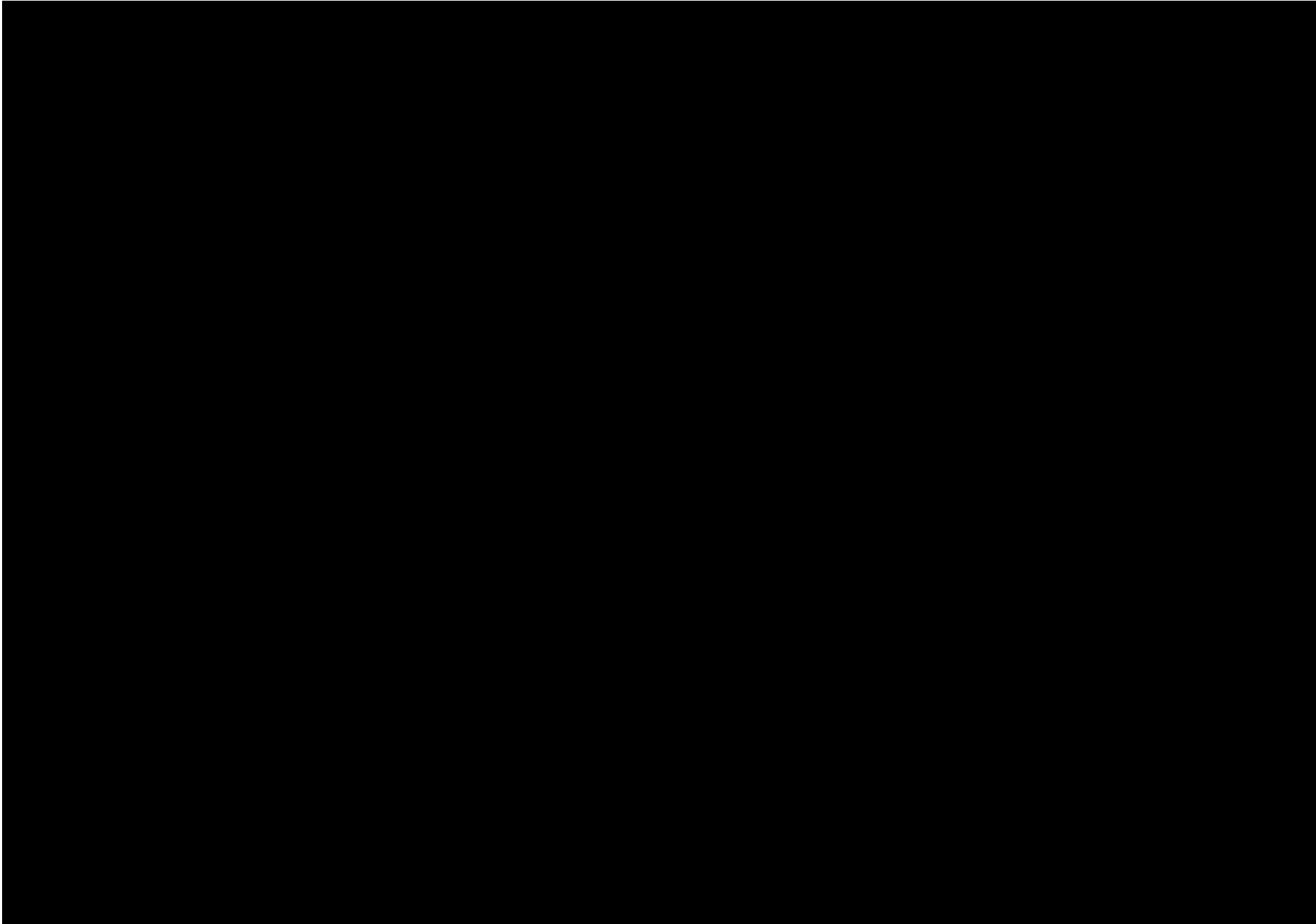


Table C.5: Historical Costs

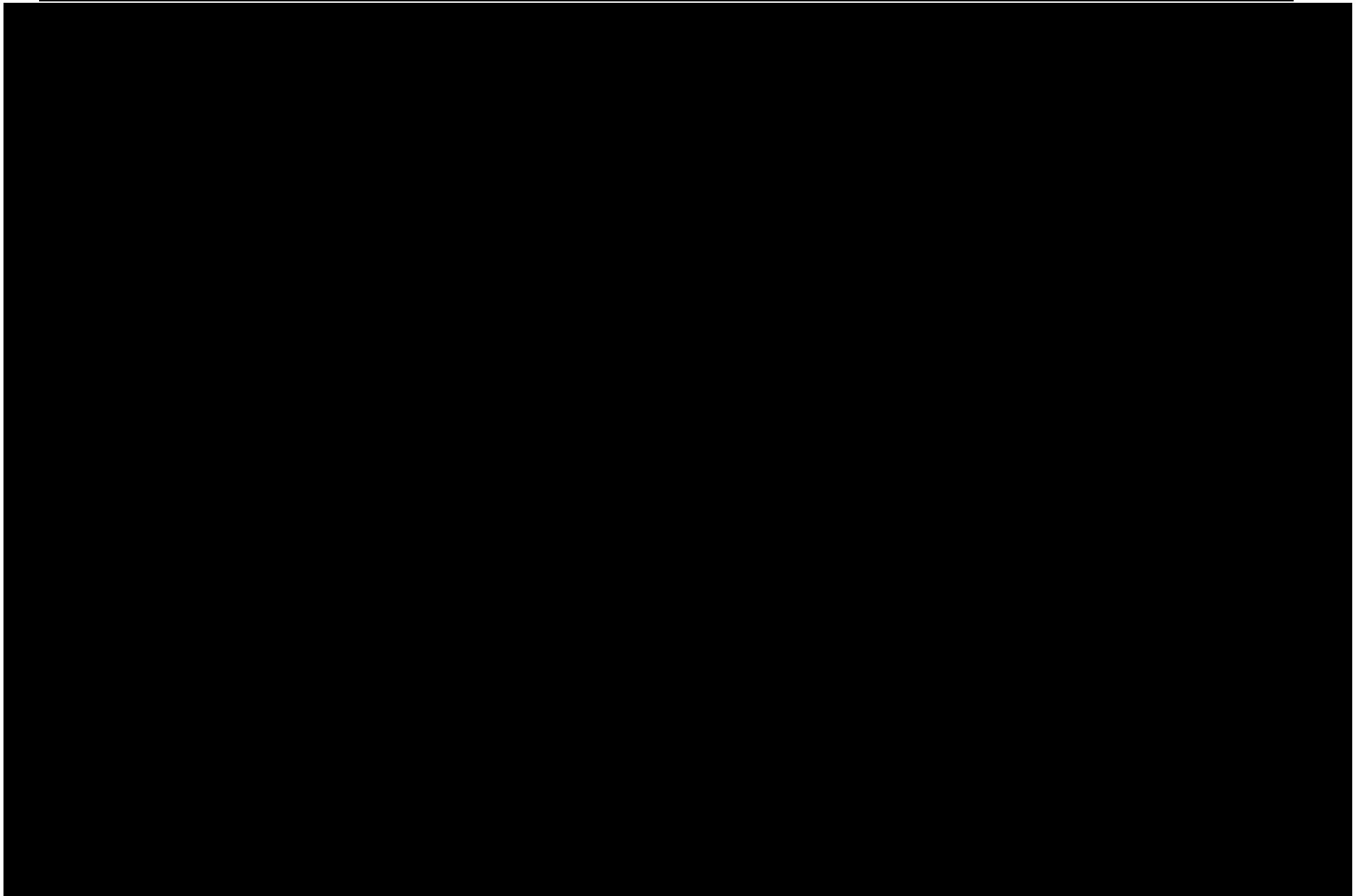


Table C.5: Historical Costs

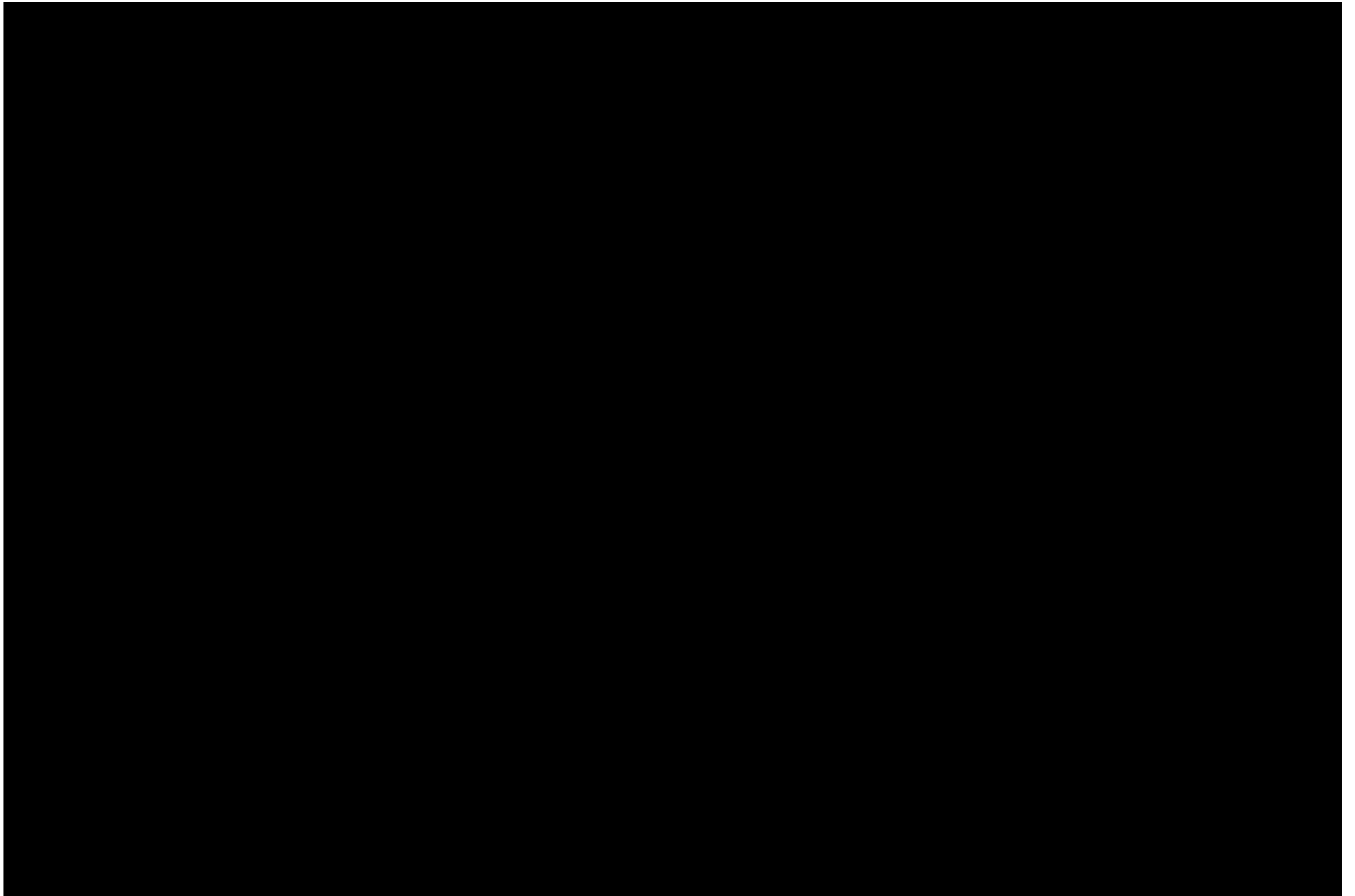


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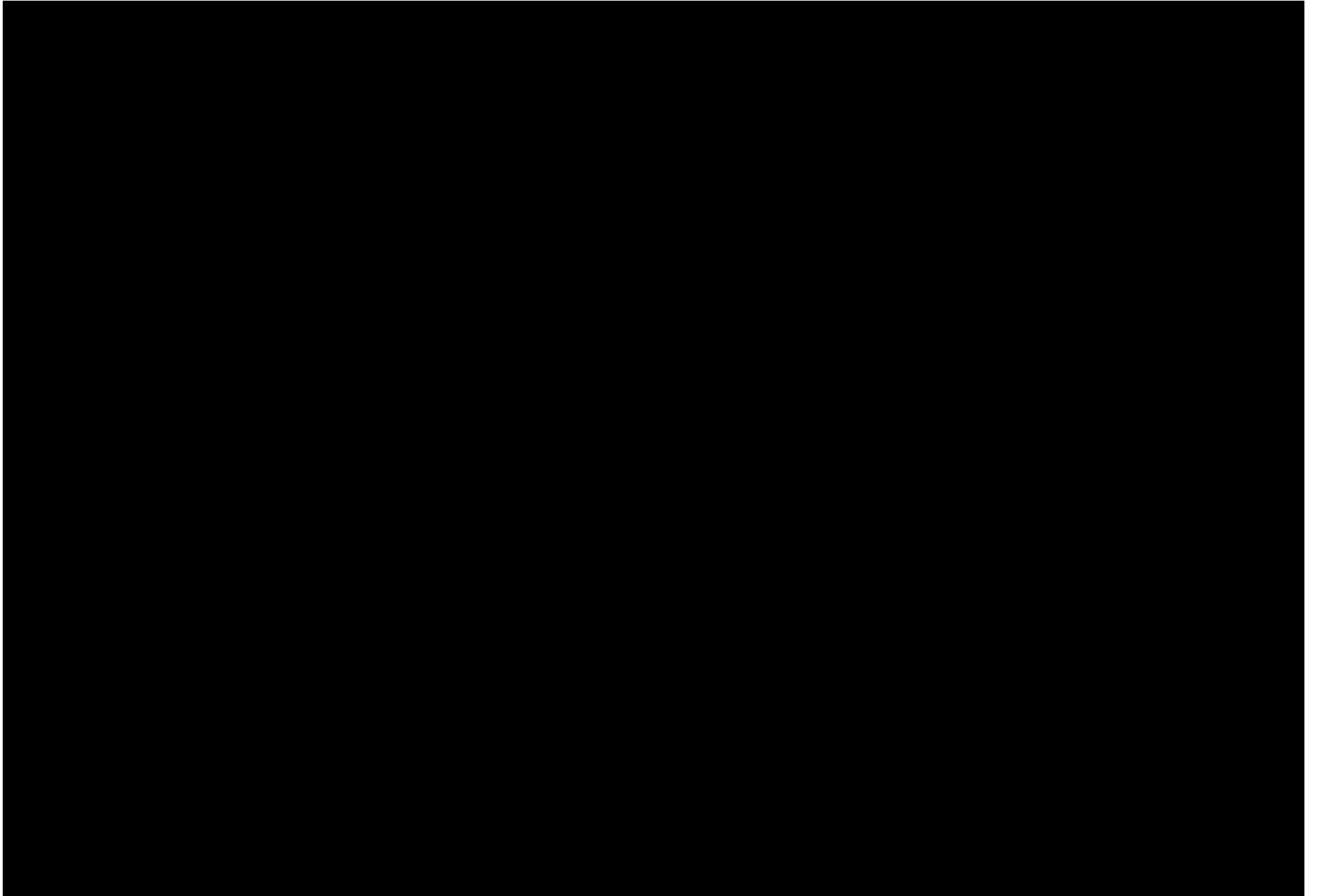


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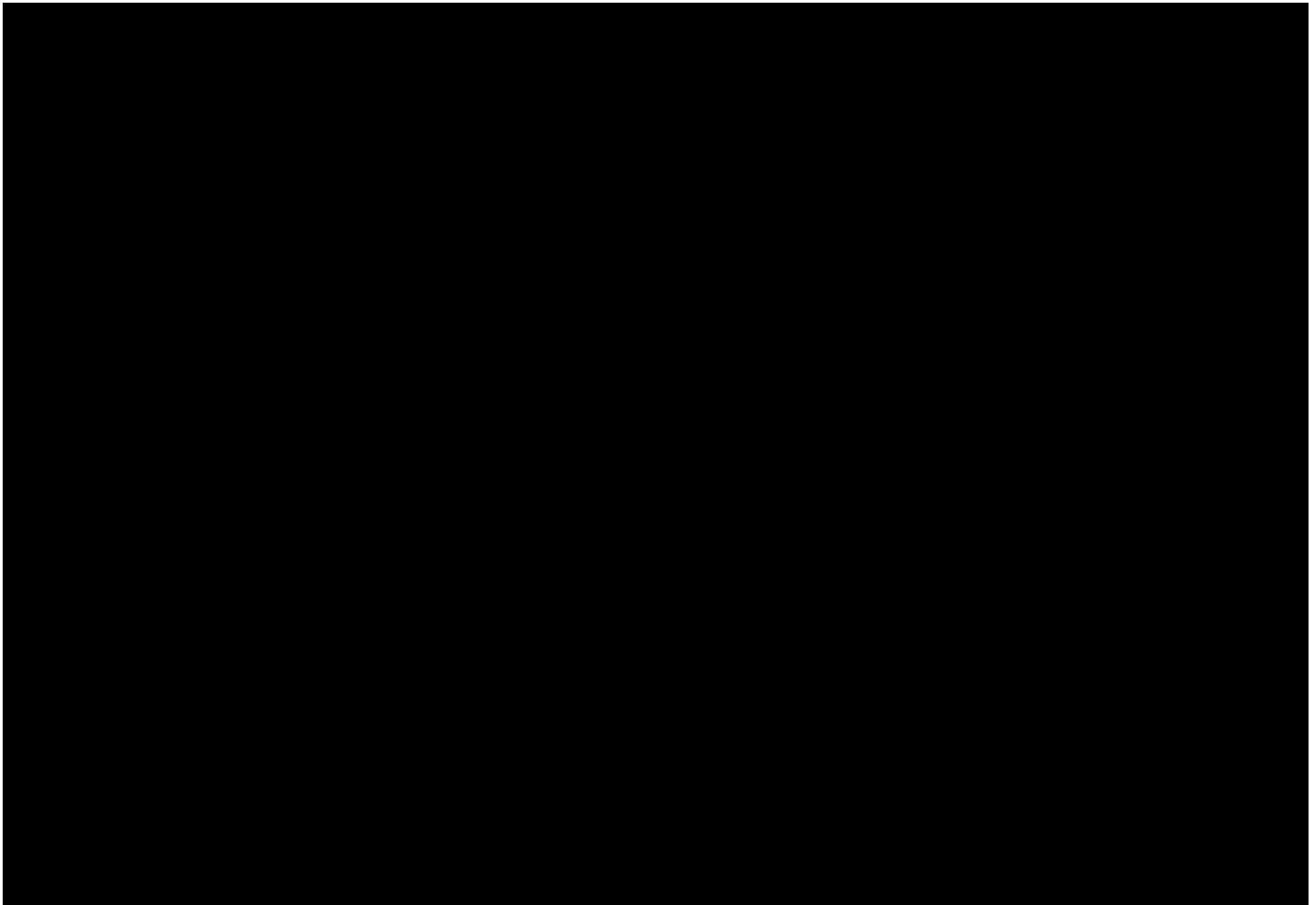


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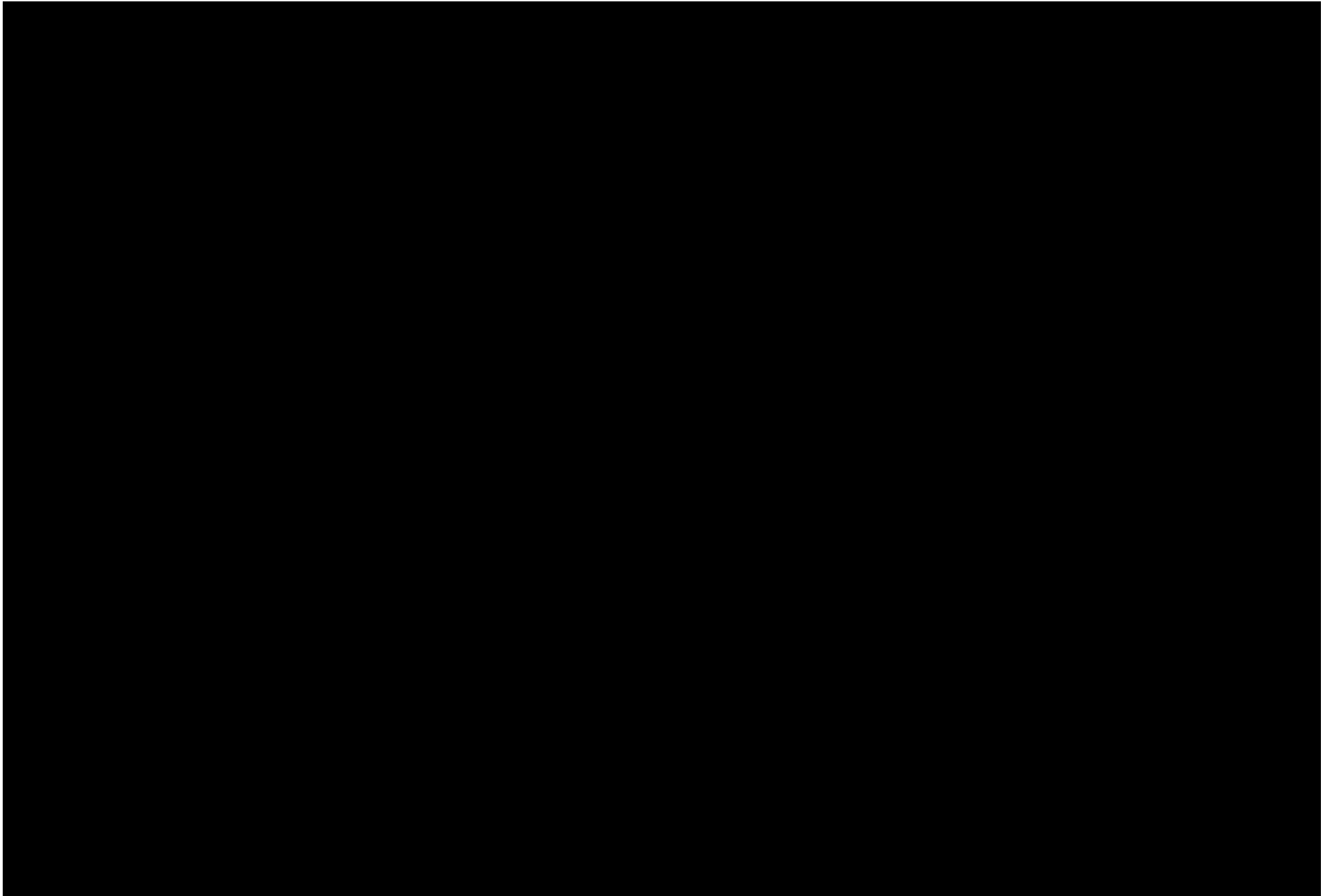


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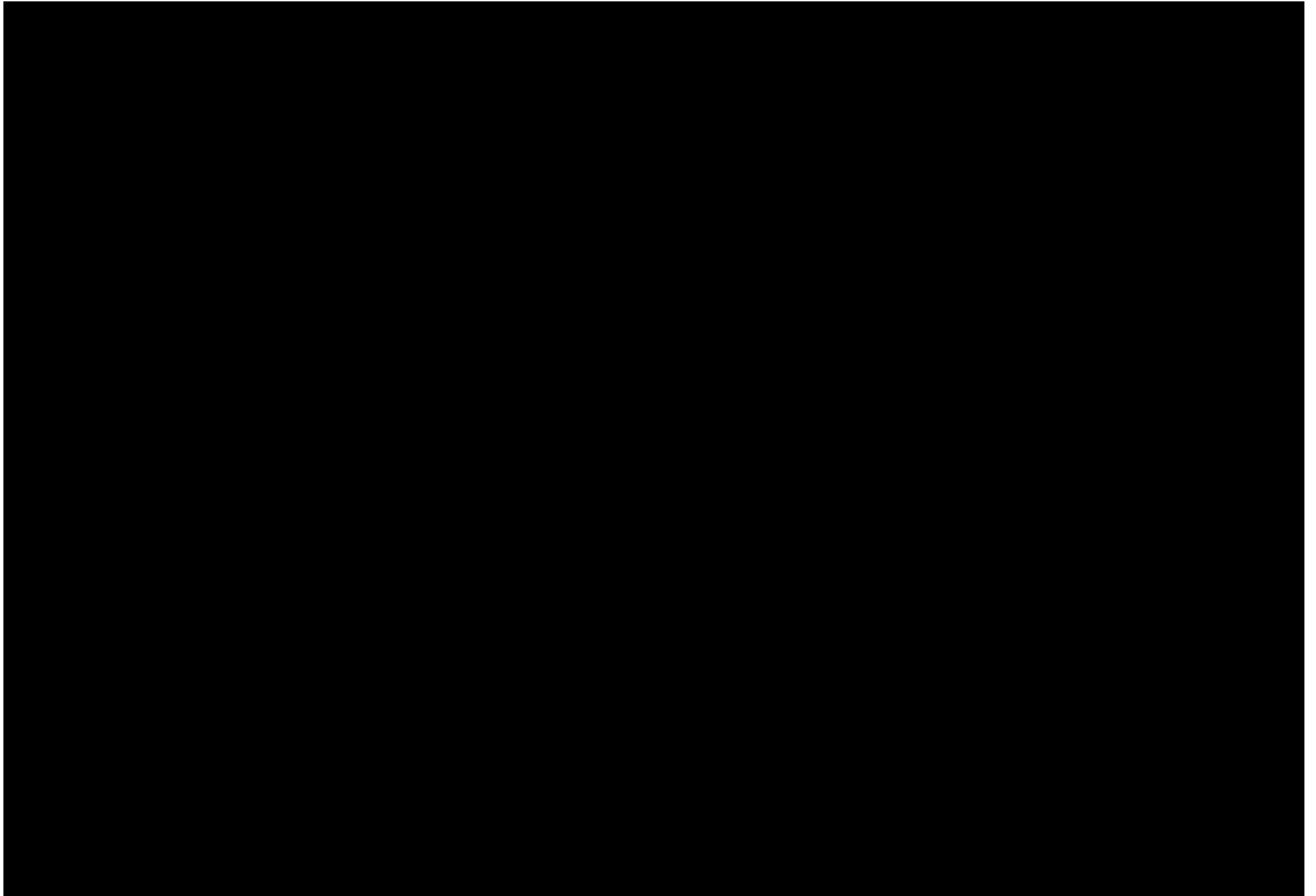


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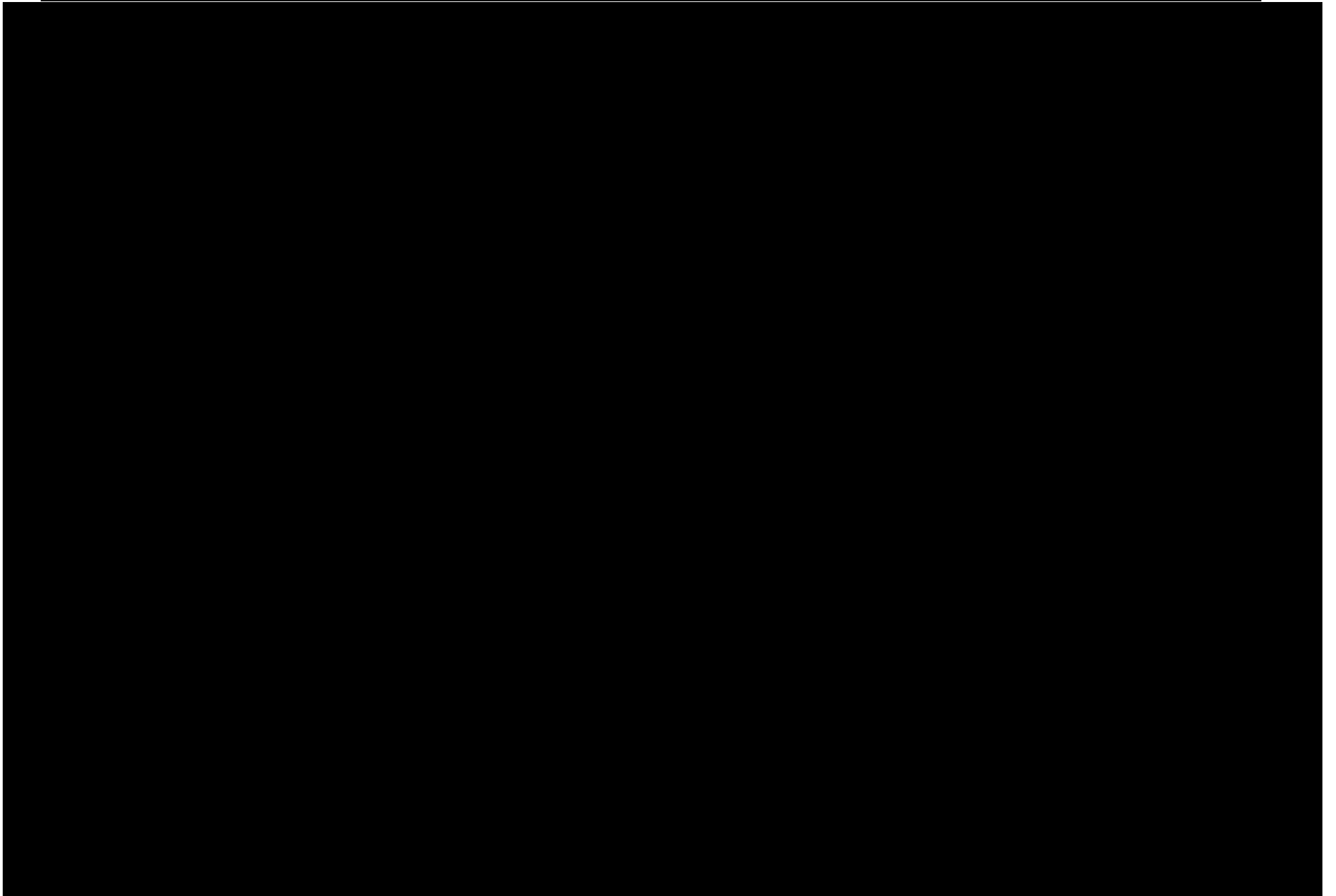


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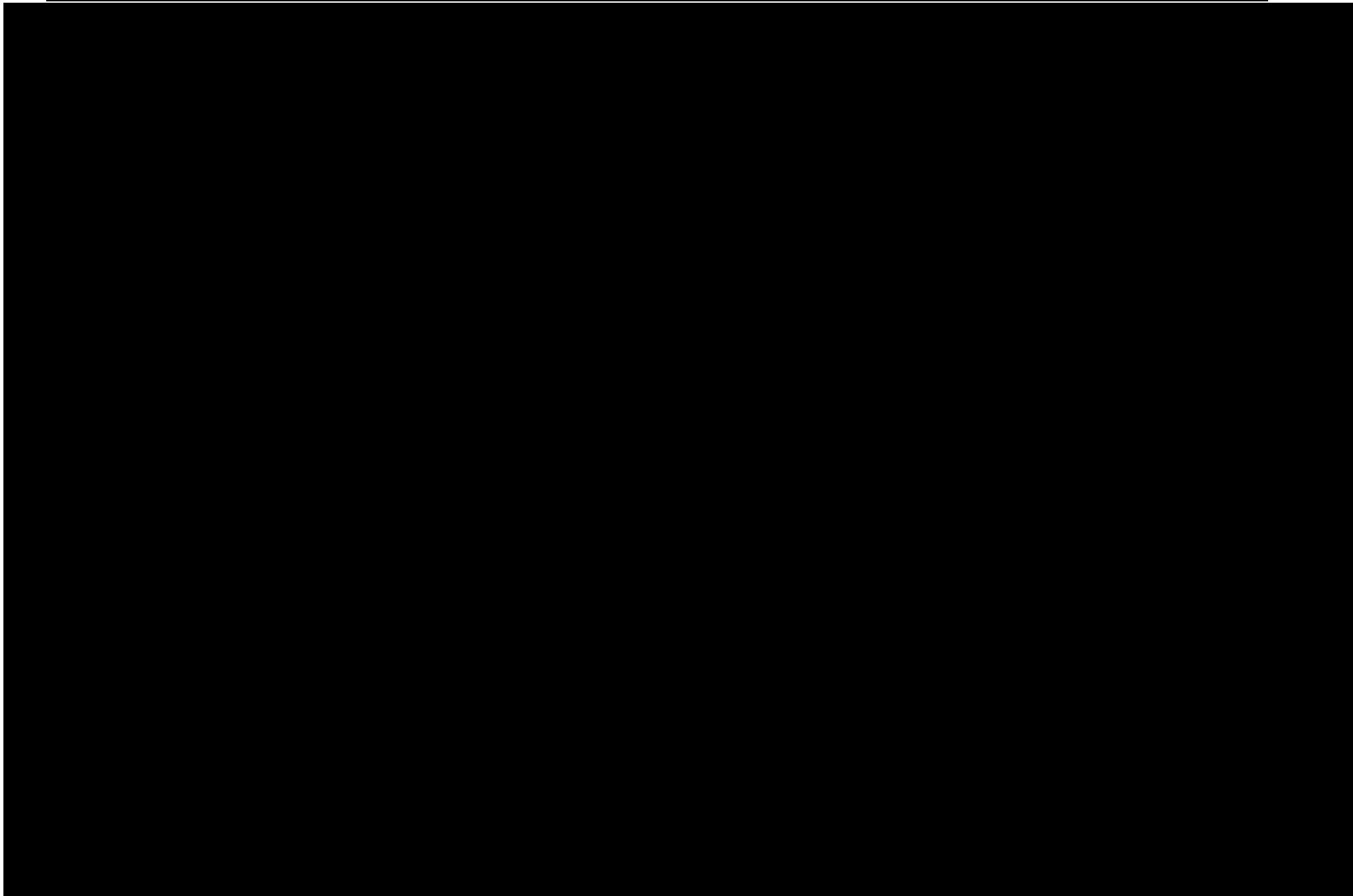


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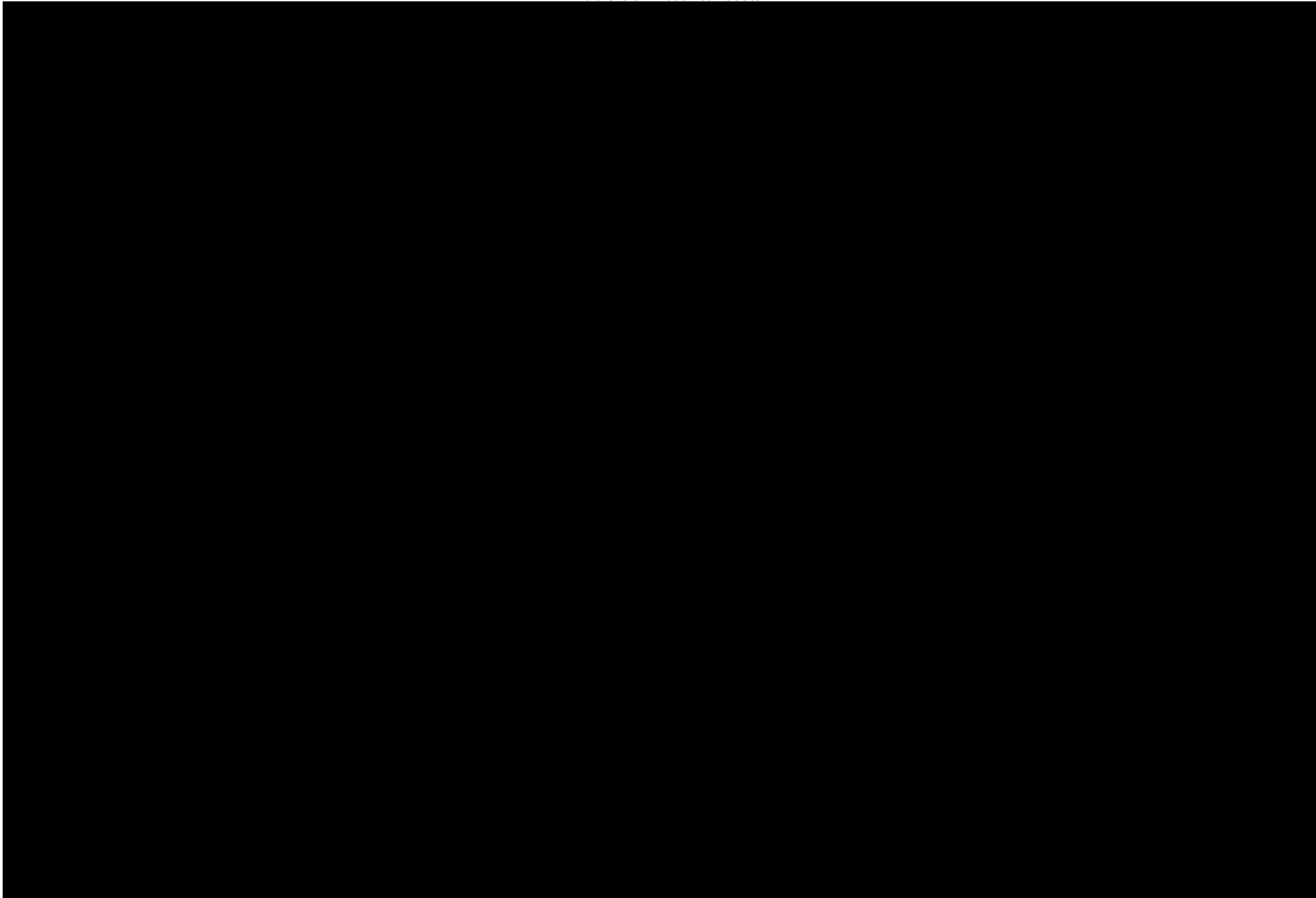


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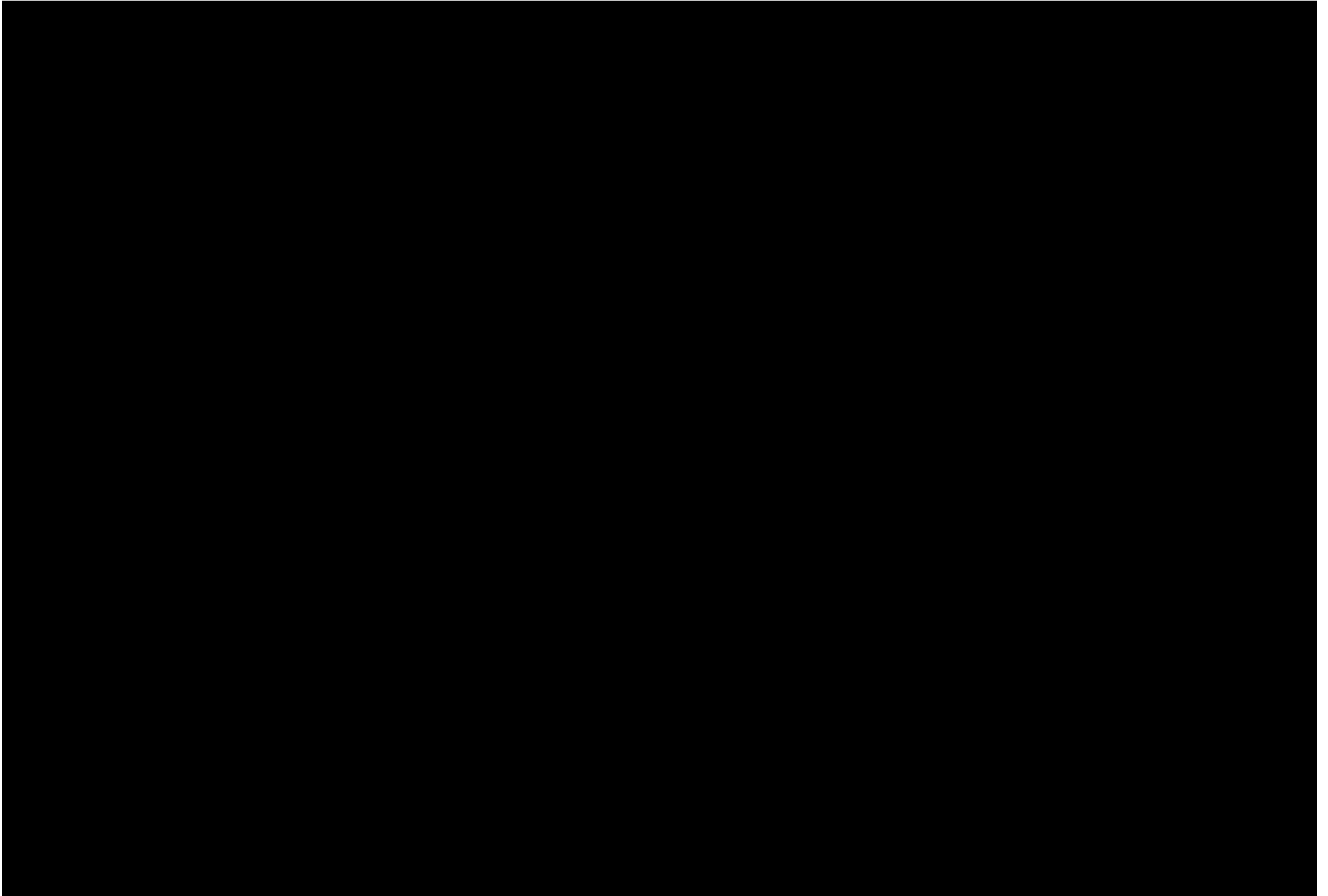


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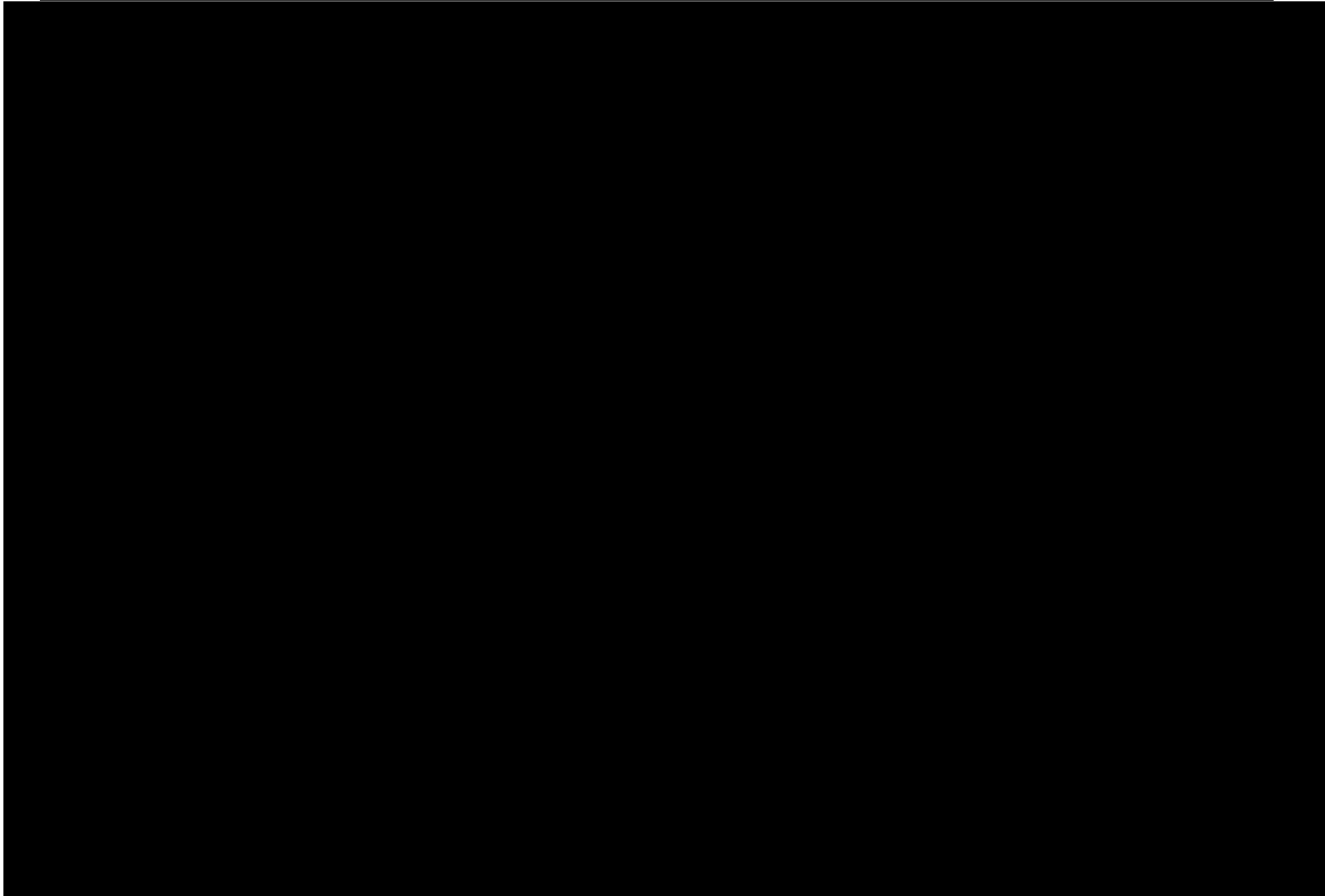


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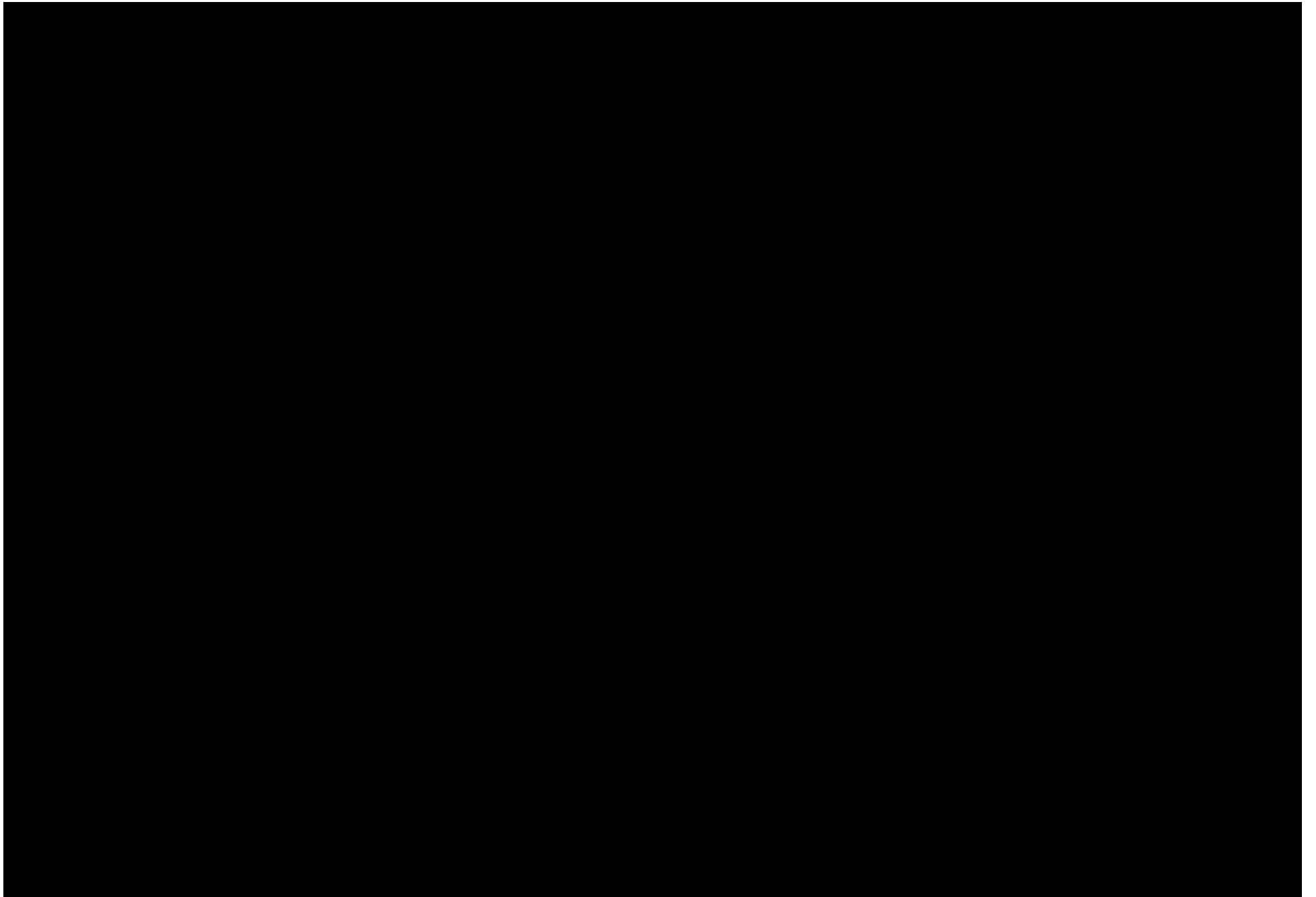


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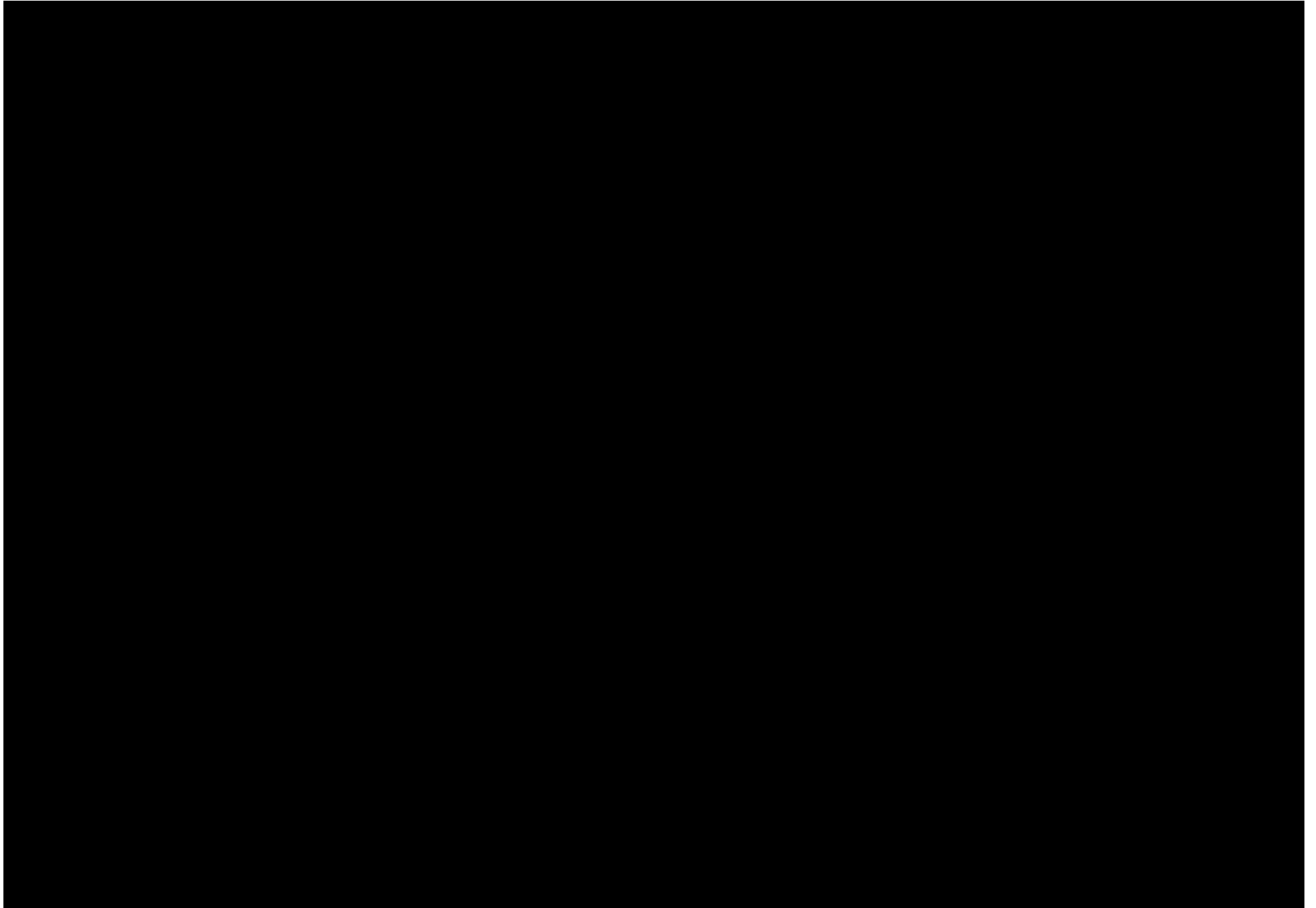


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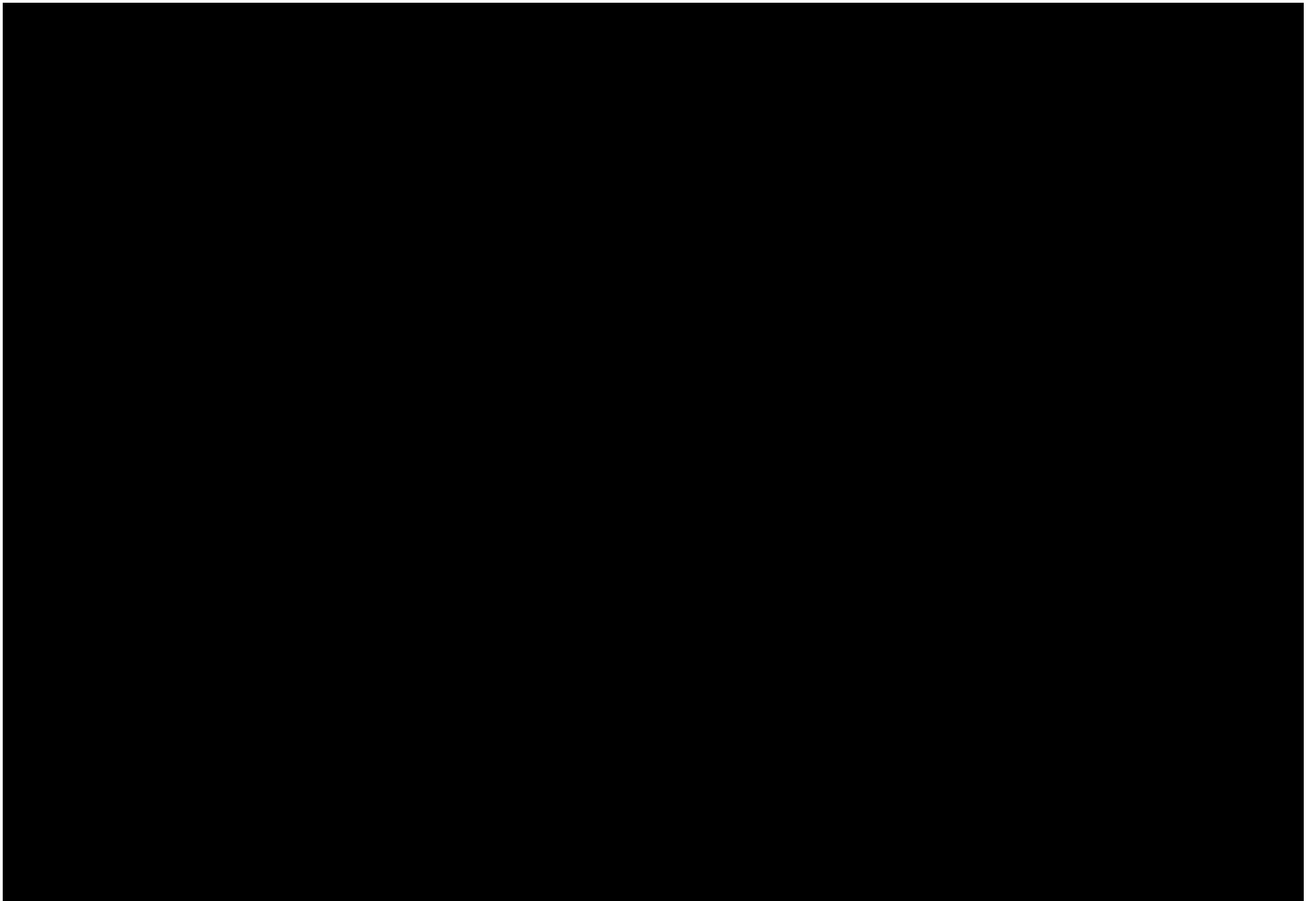


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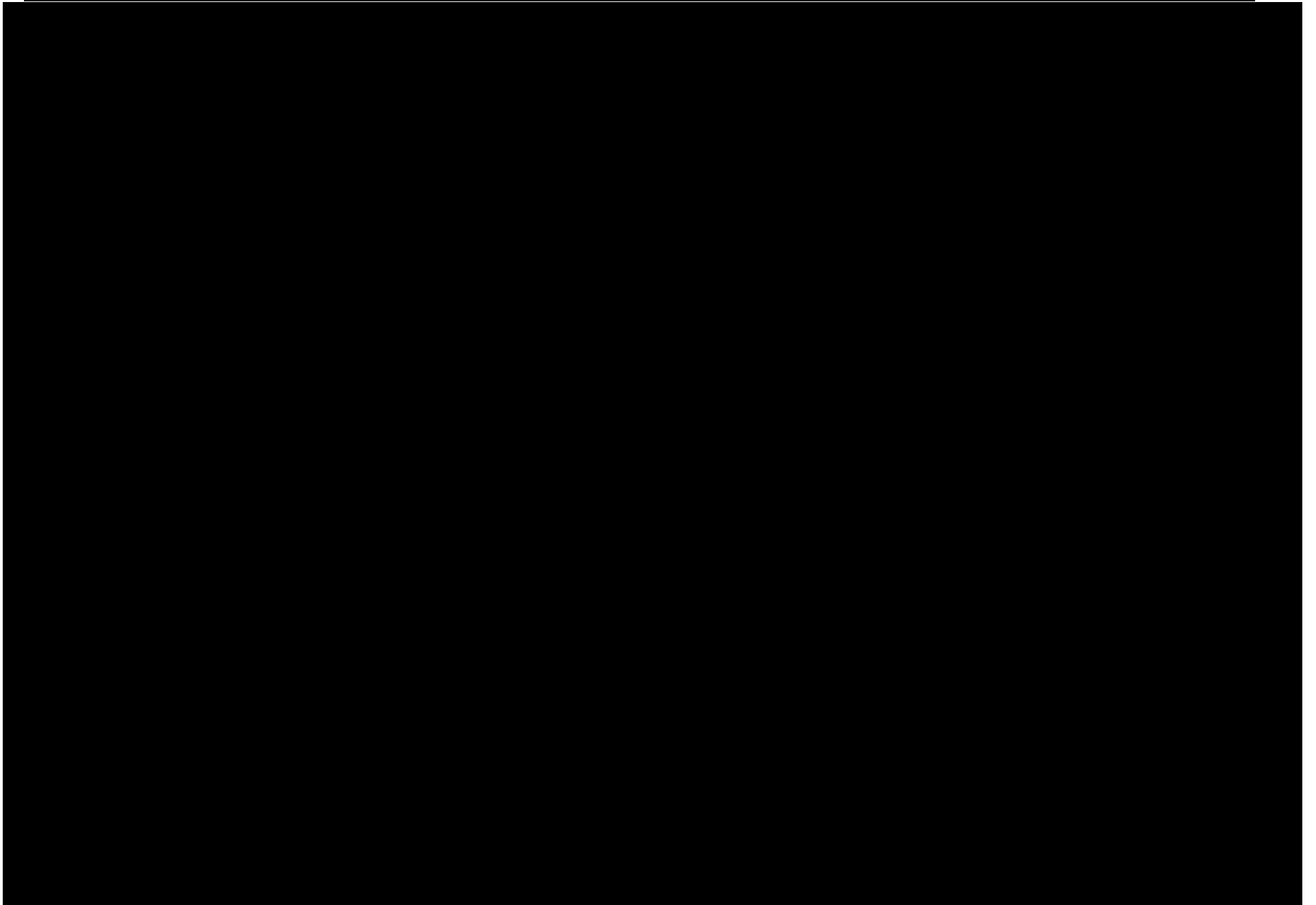


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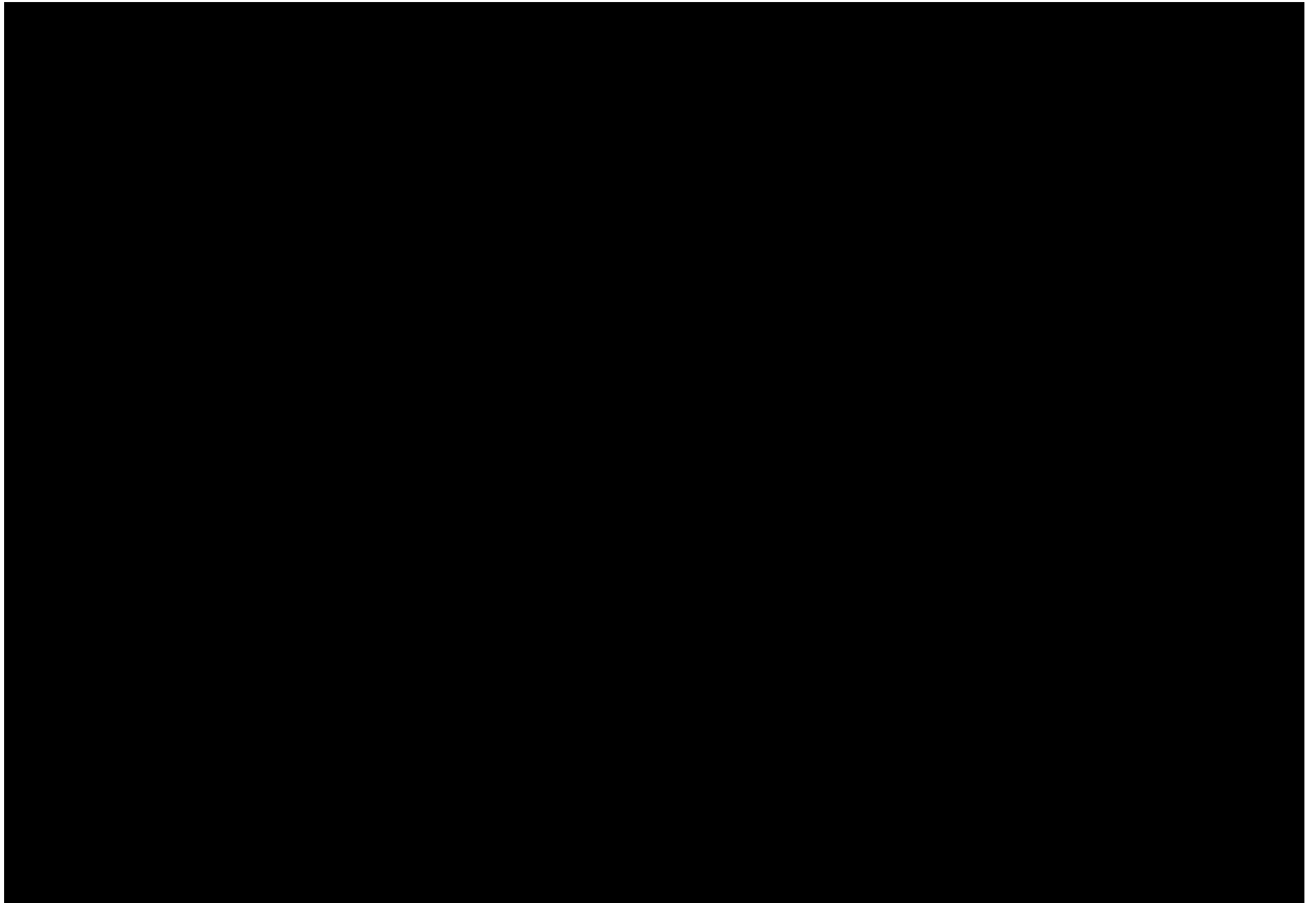


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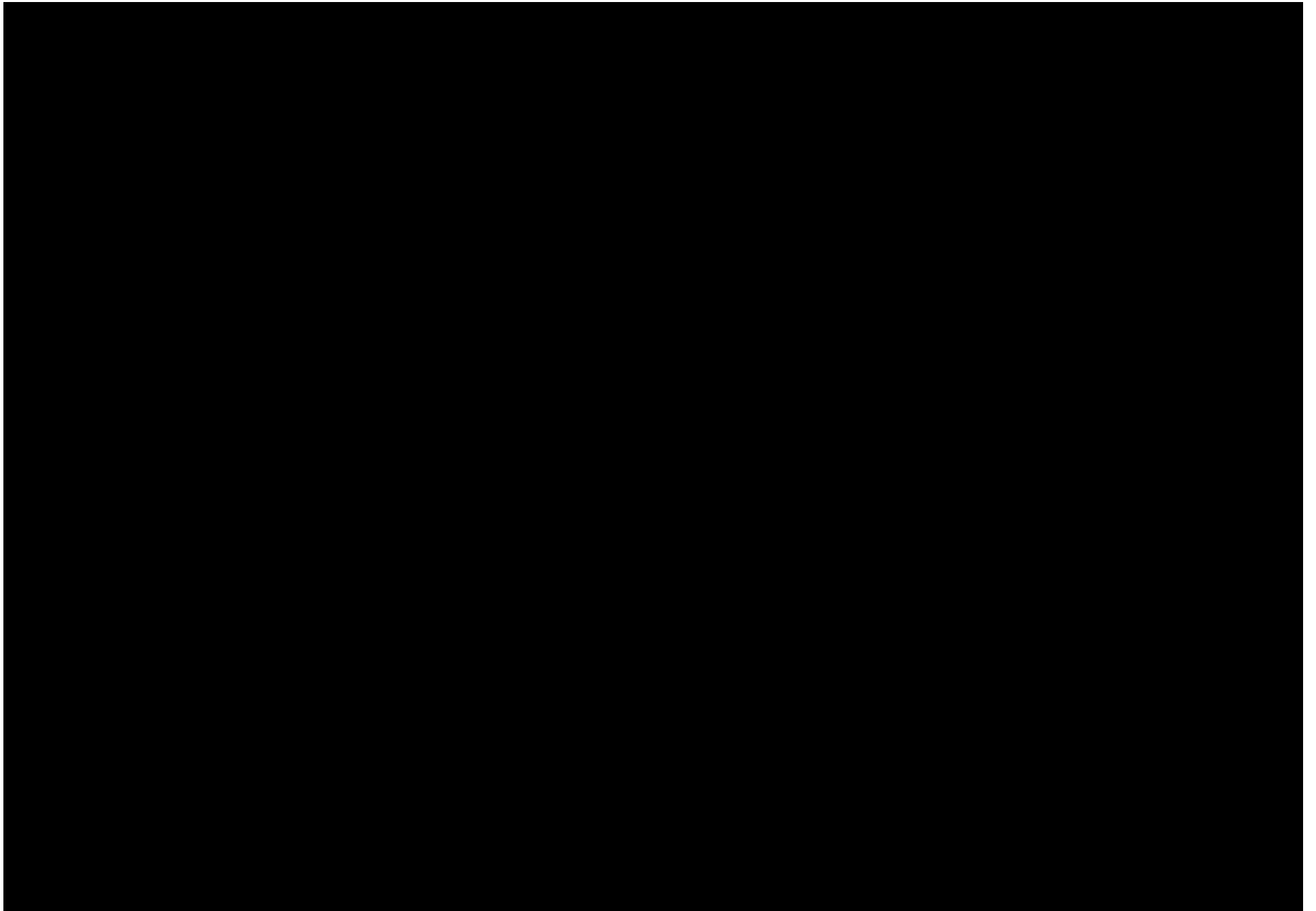


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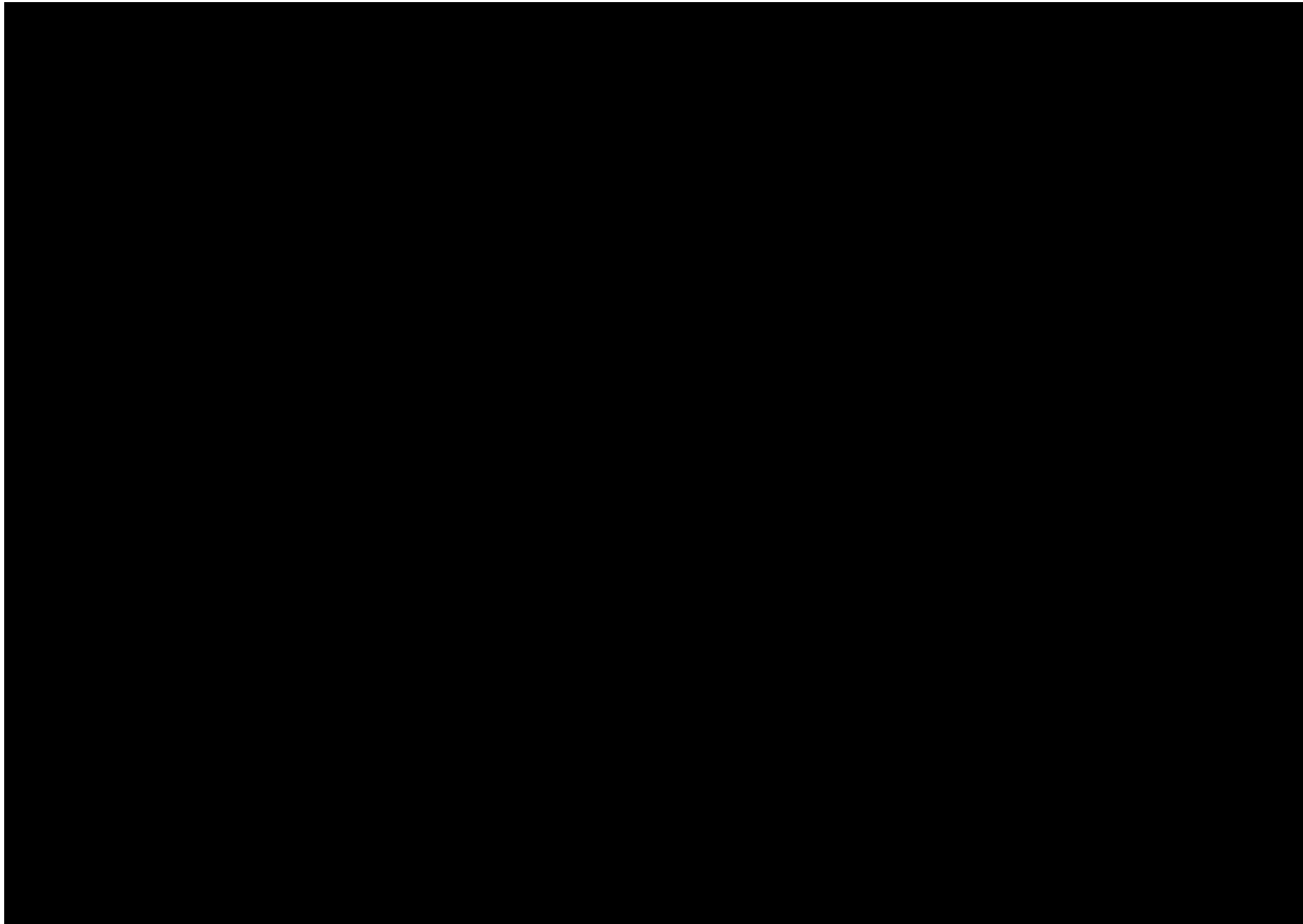


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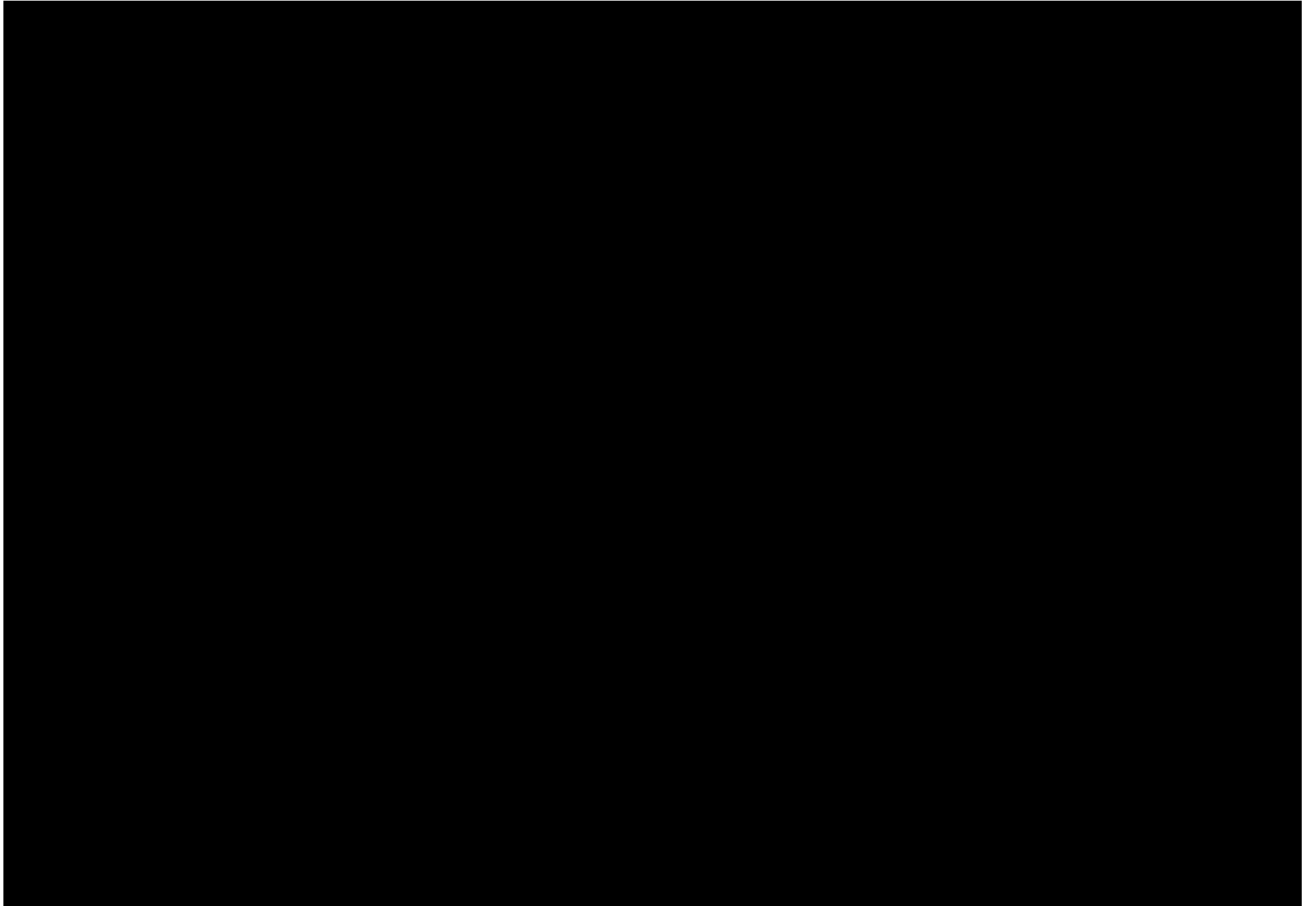


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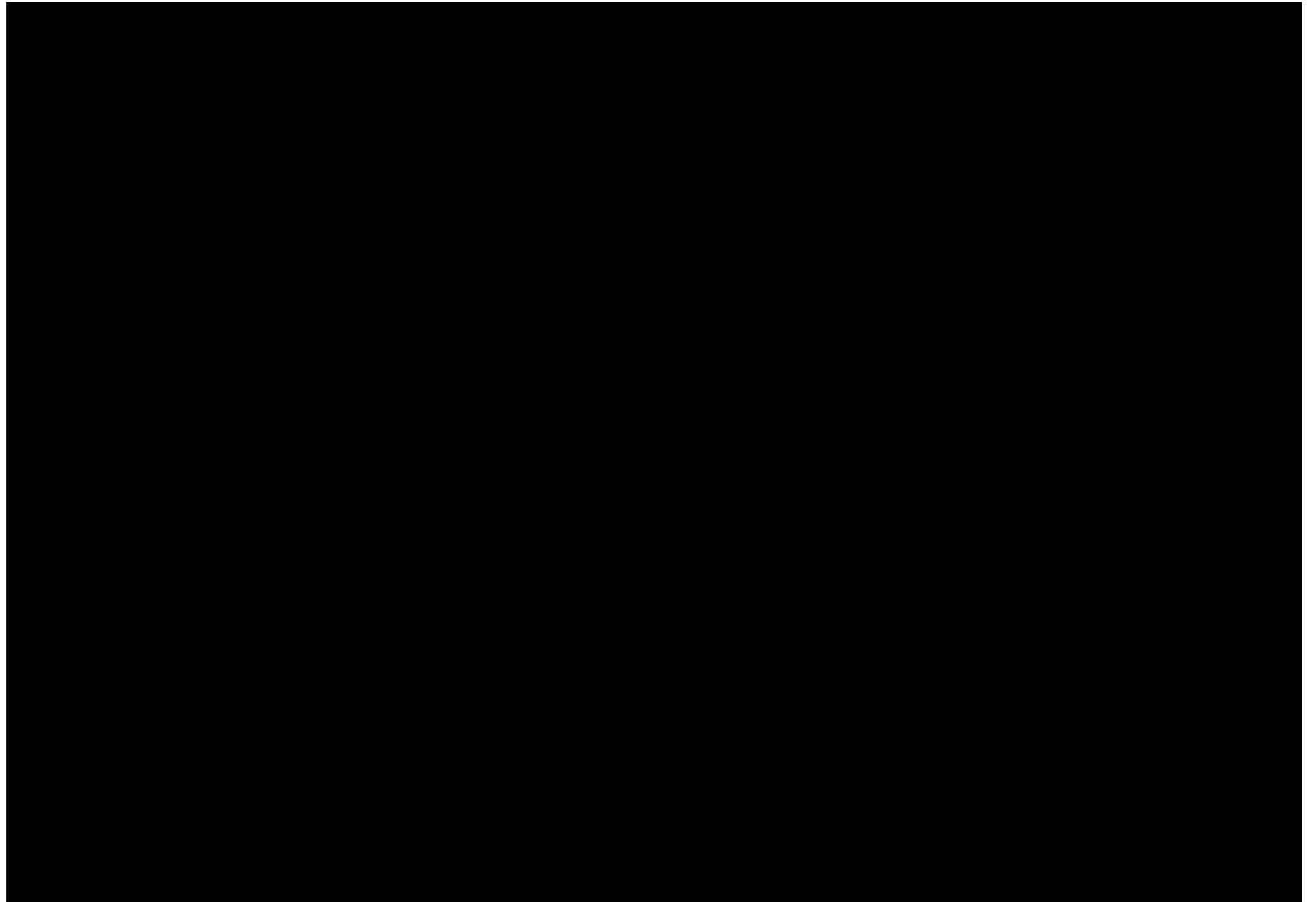


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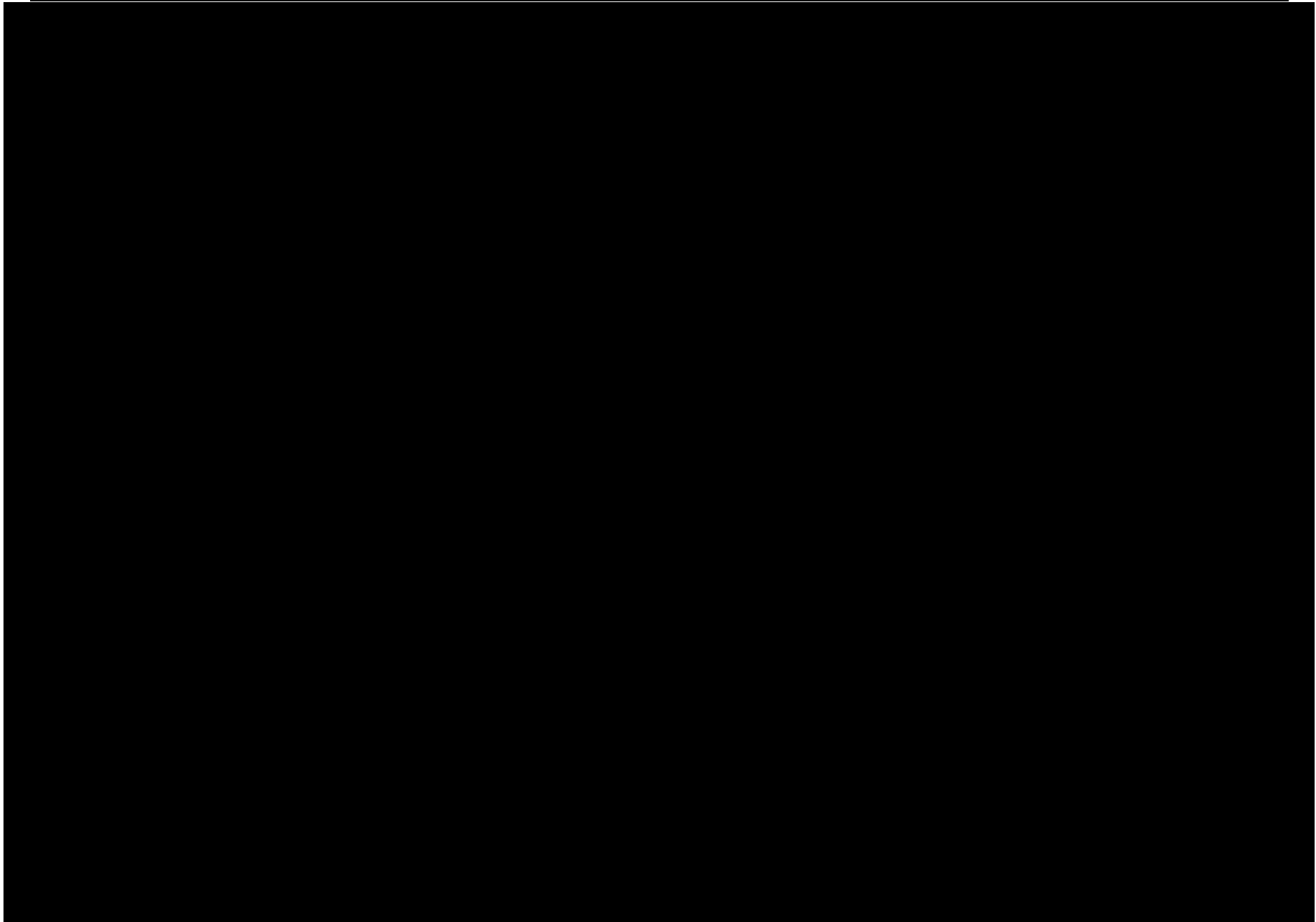


Table C.5: Historical Costs

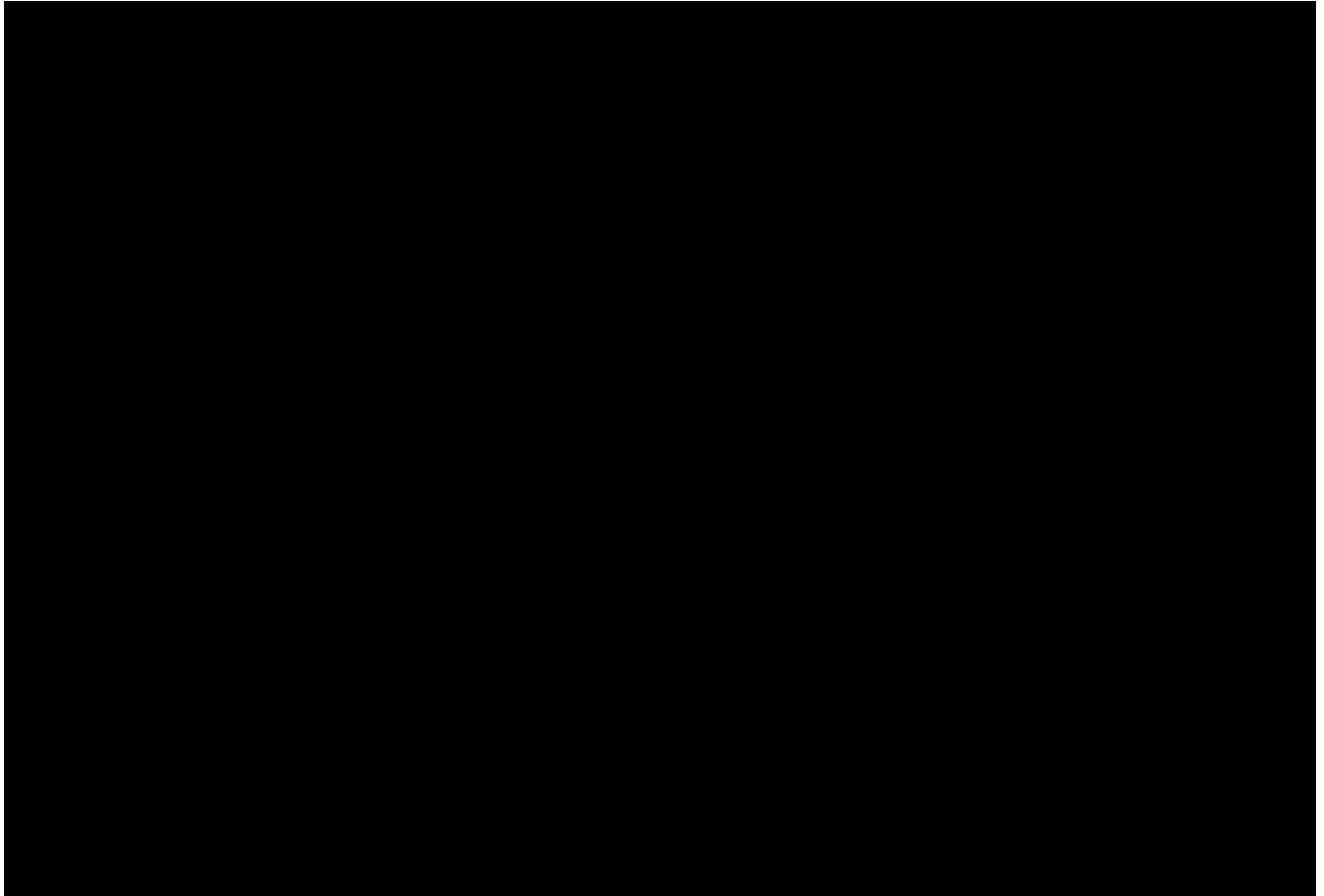


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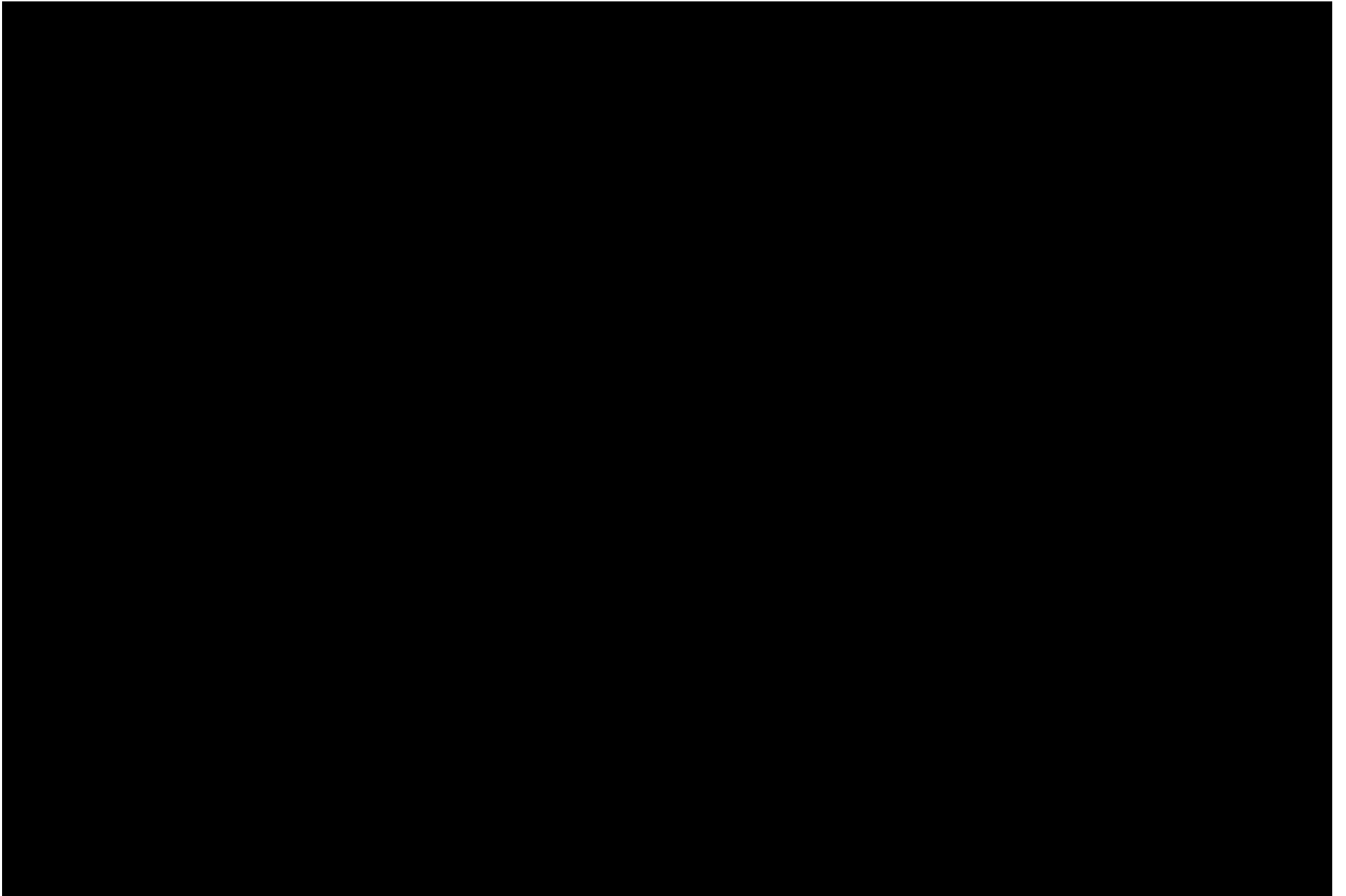


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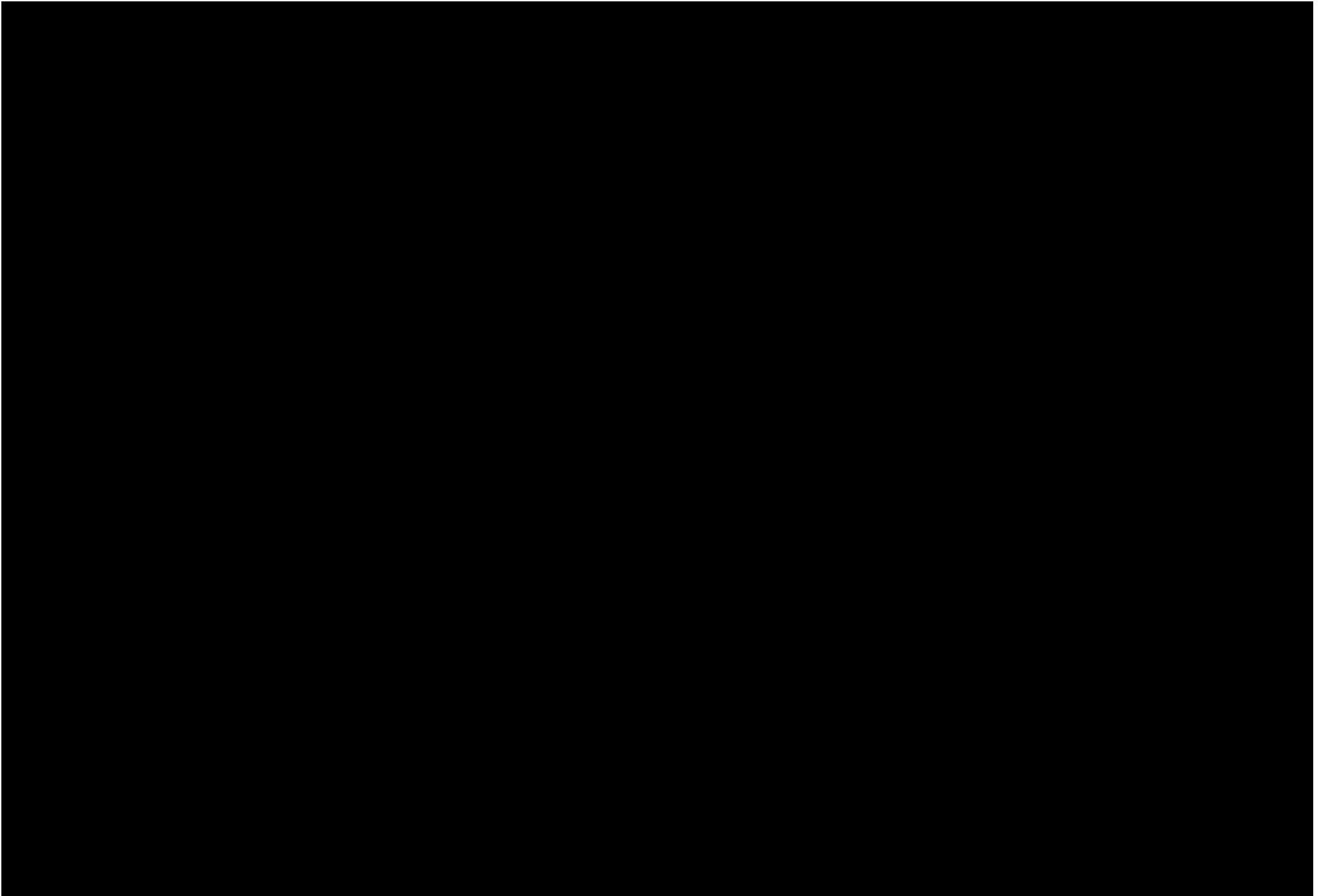


Table C.5: Historical Costs

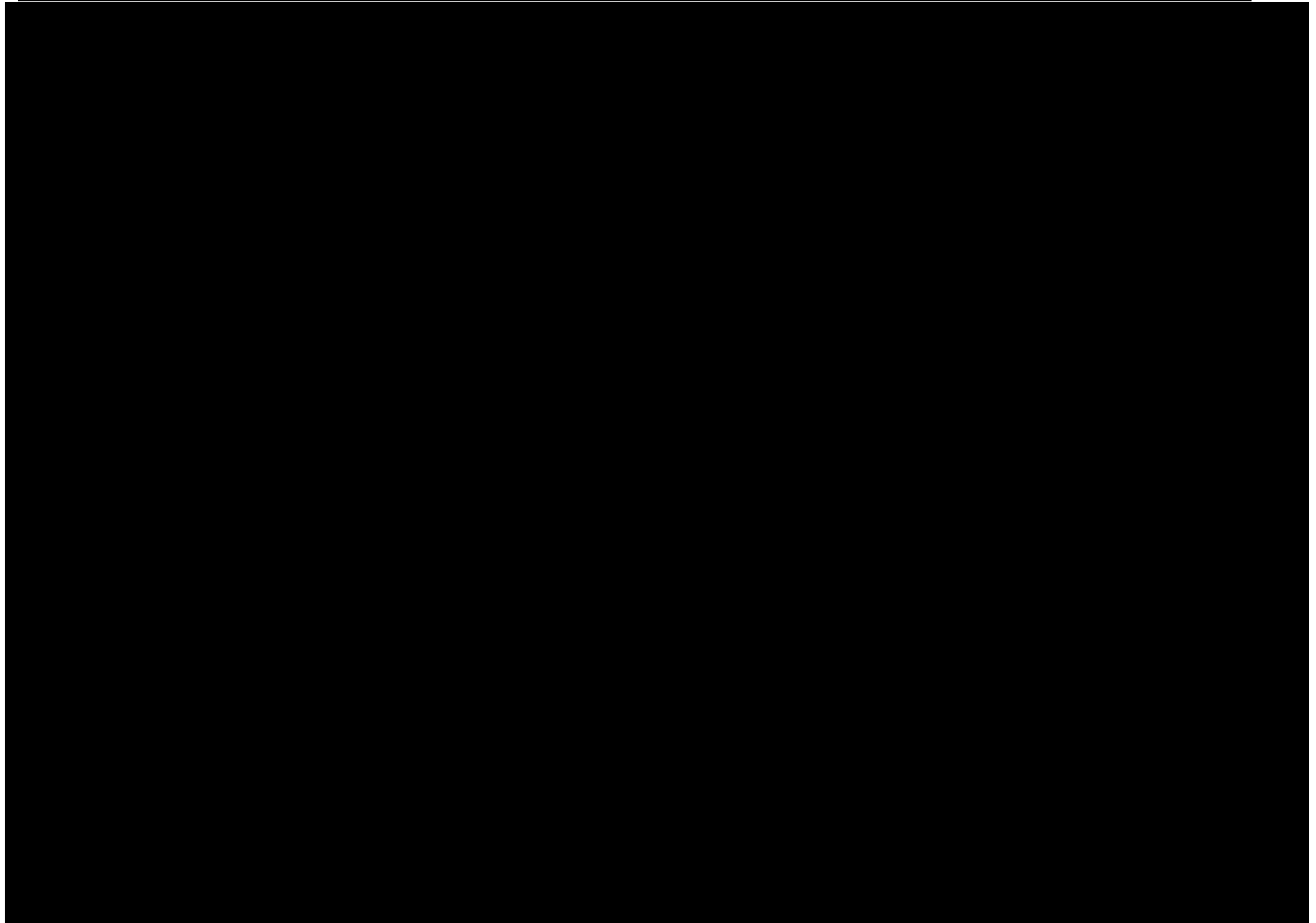


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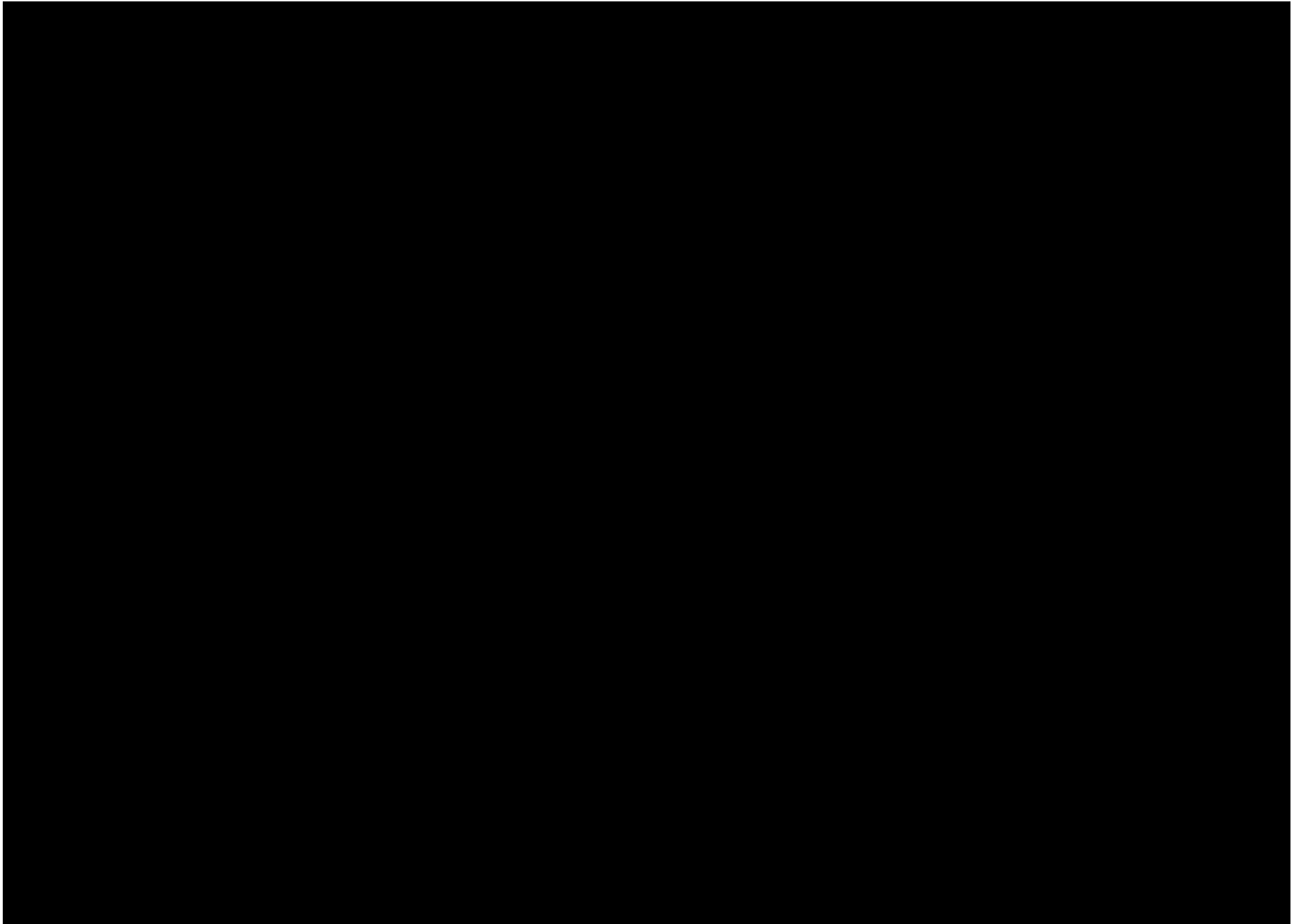


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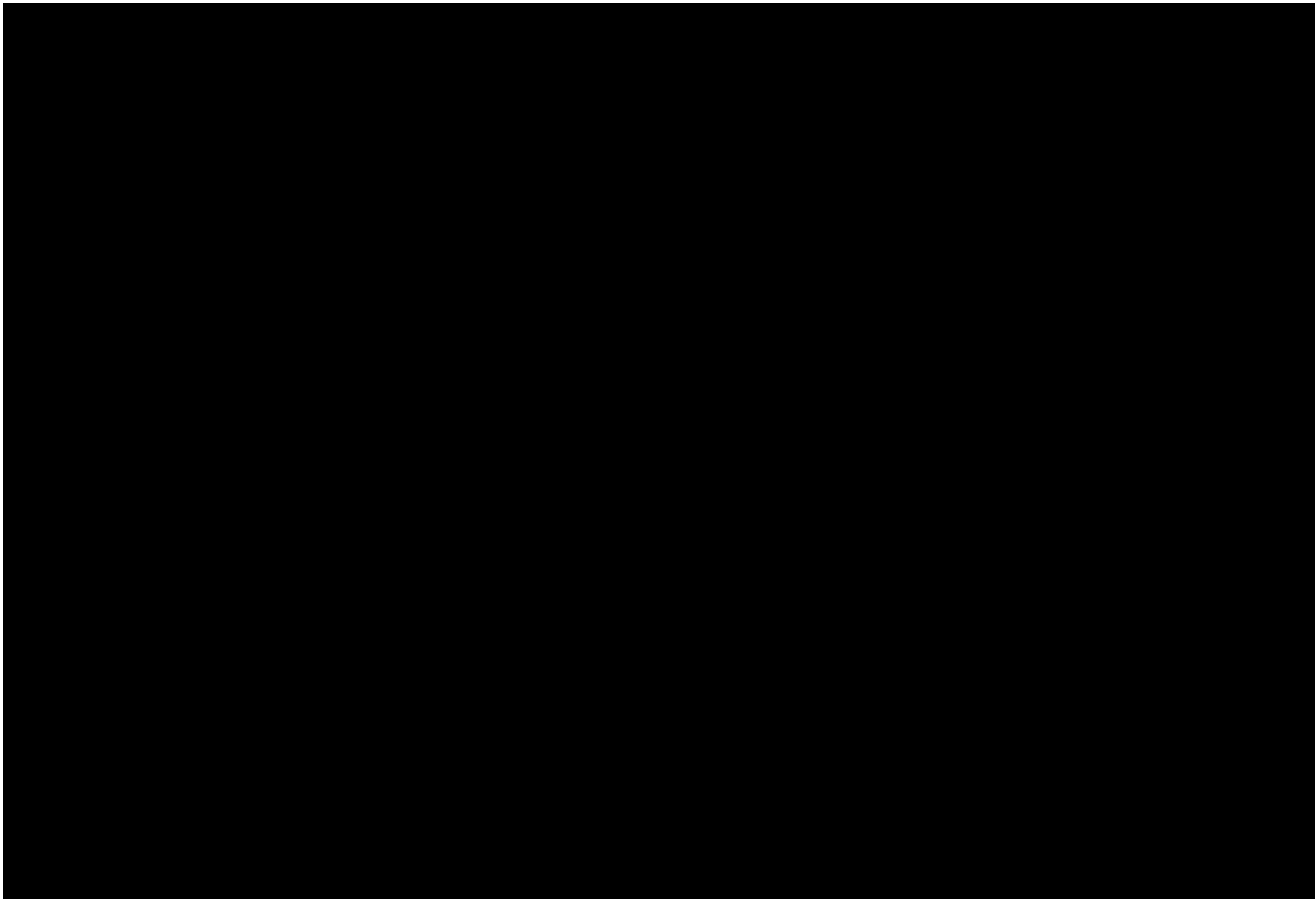


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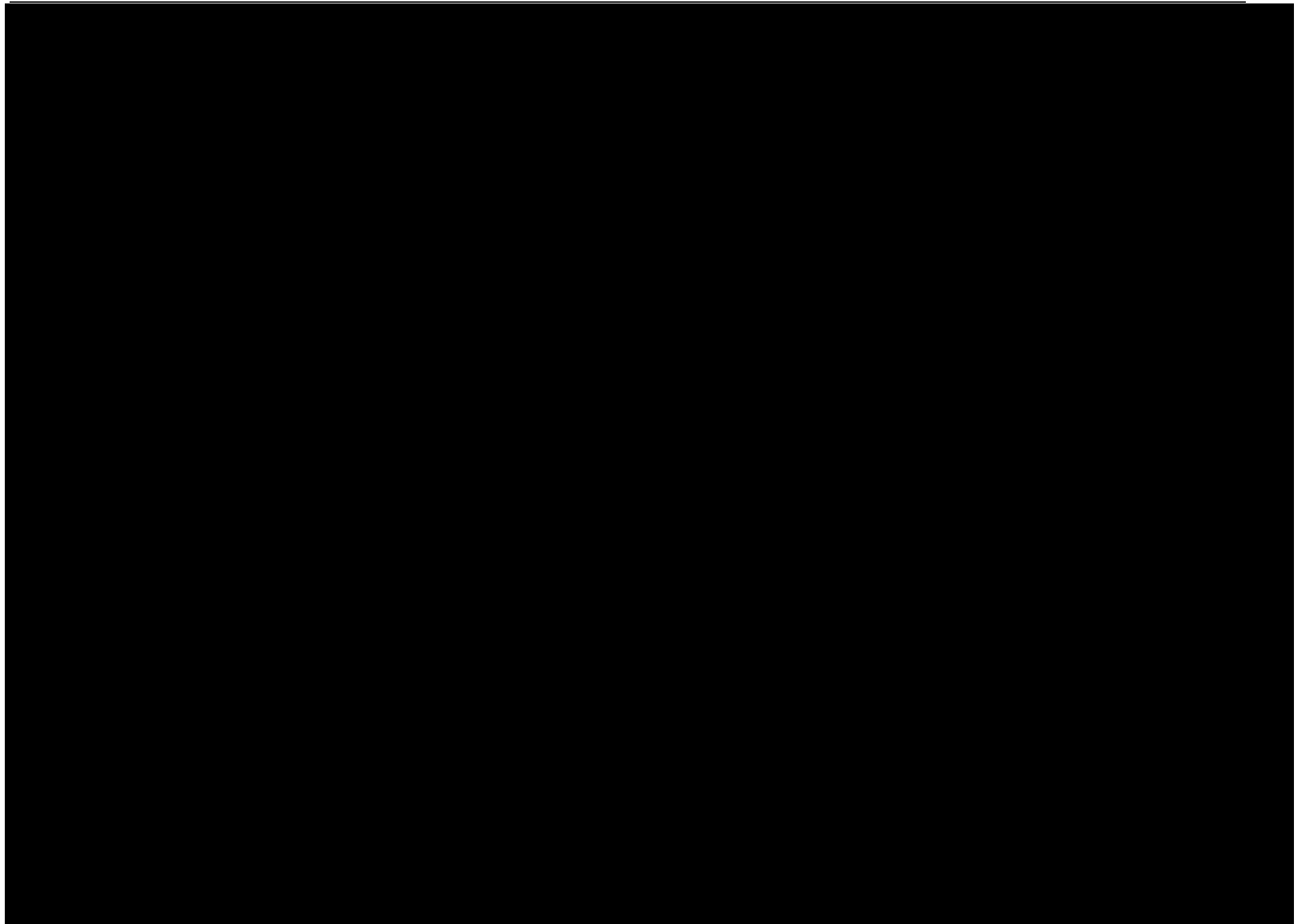


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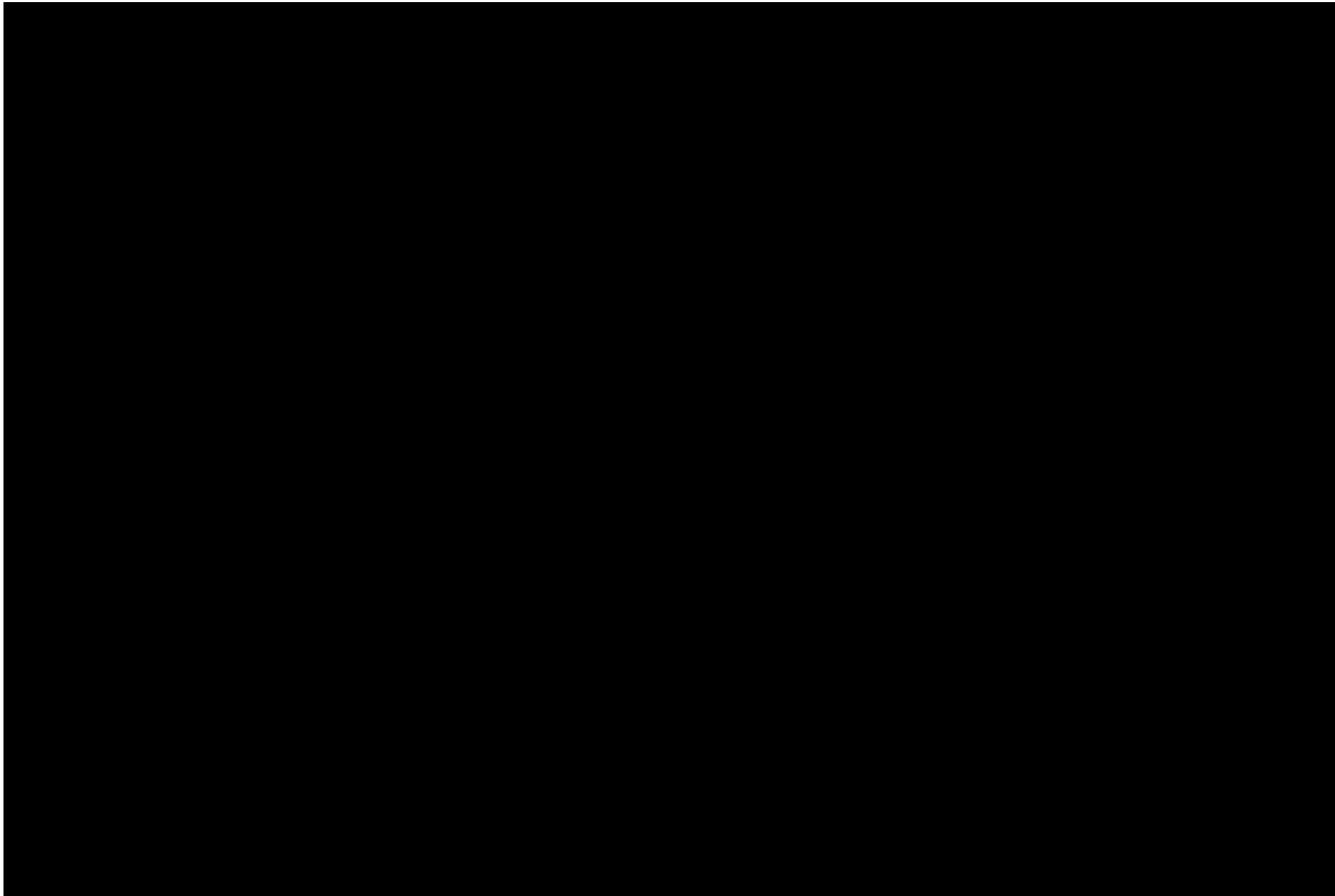


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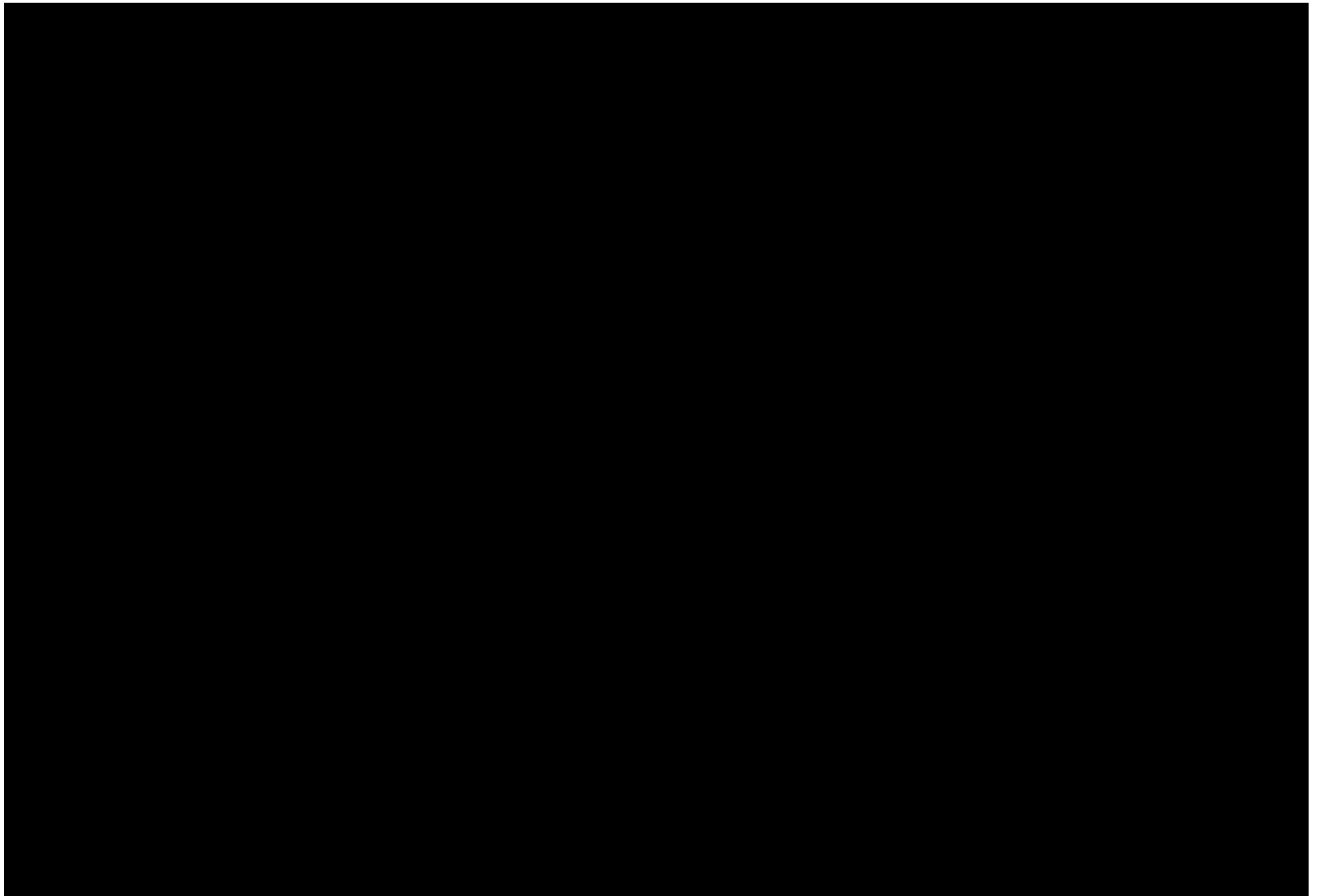


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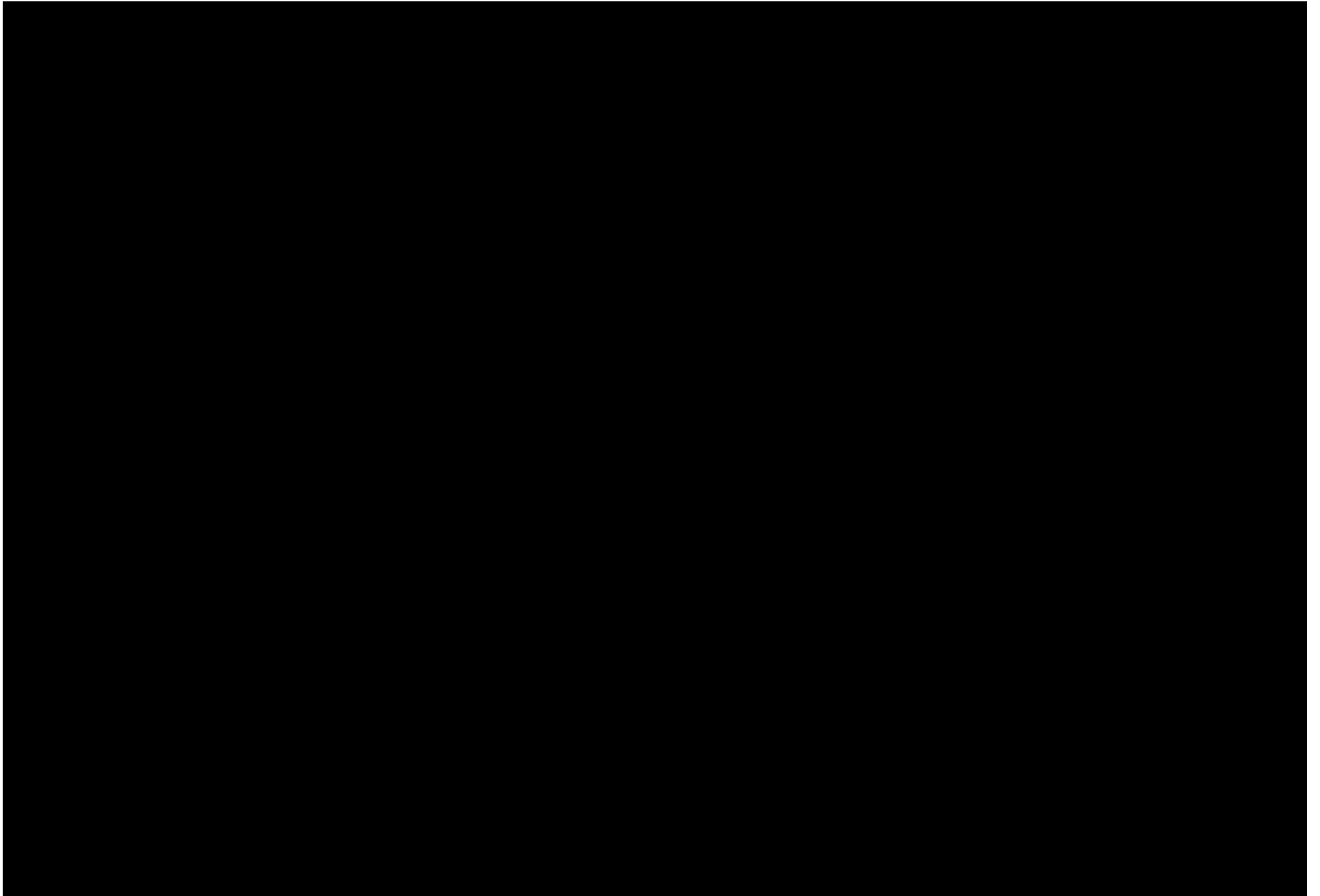


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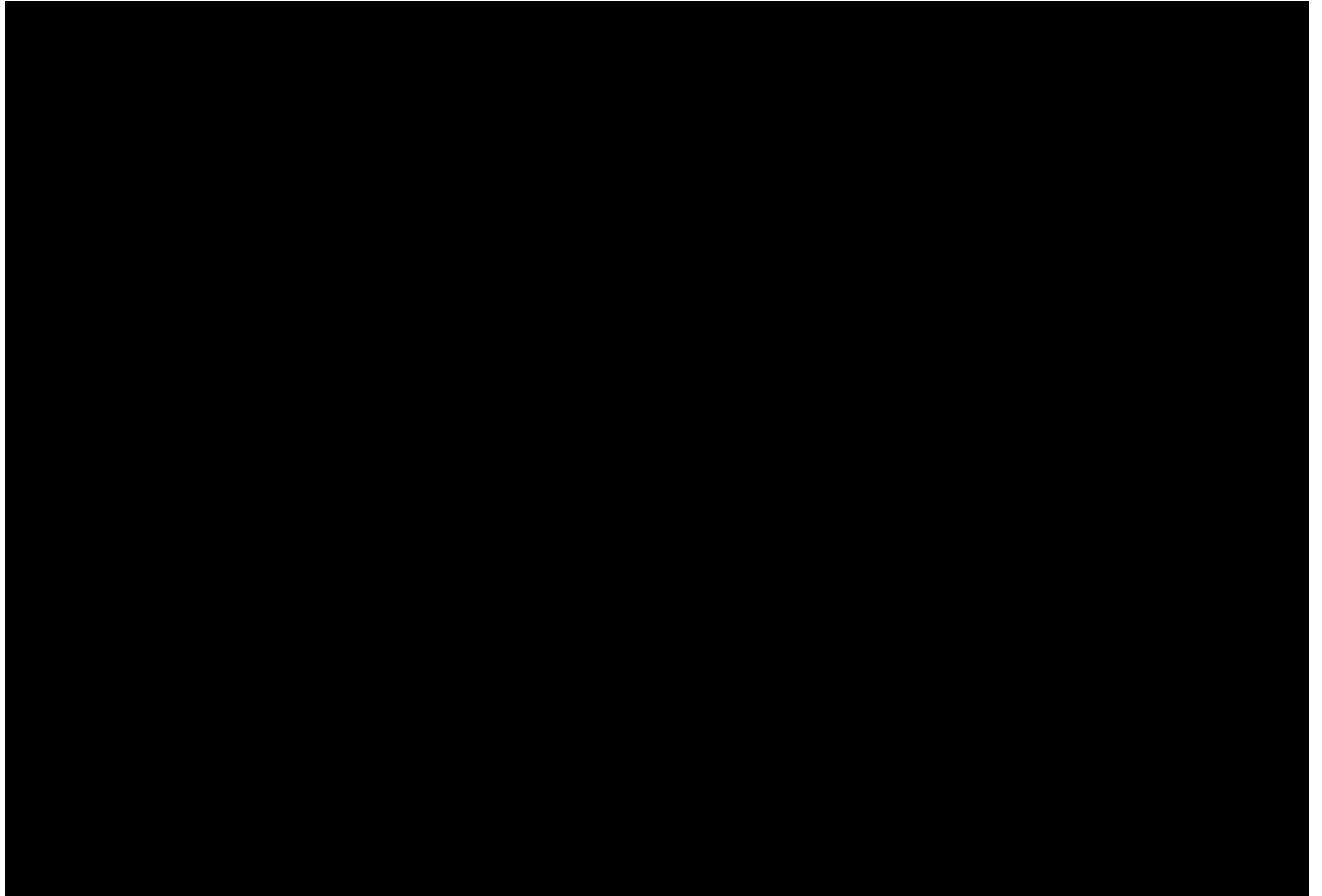


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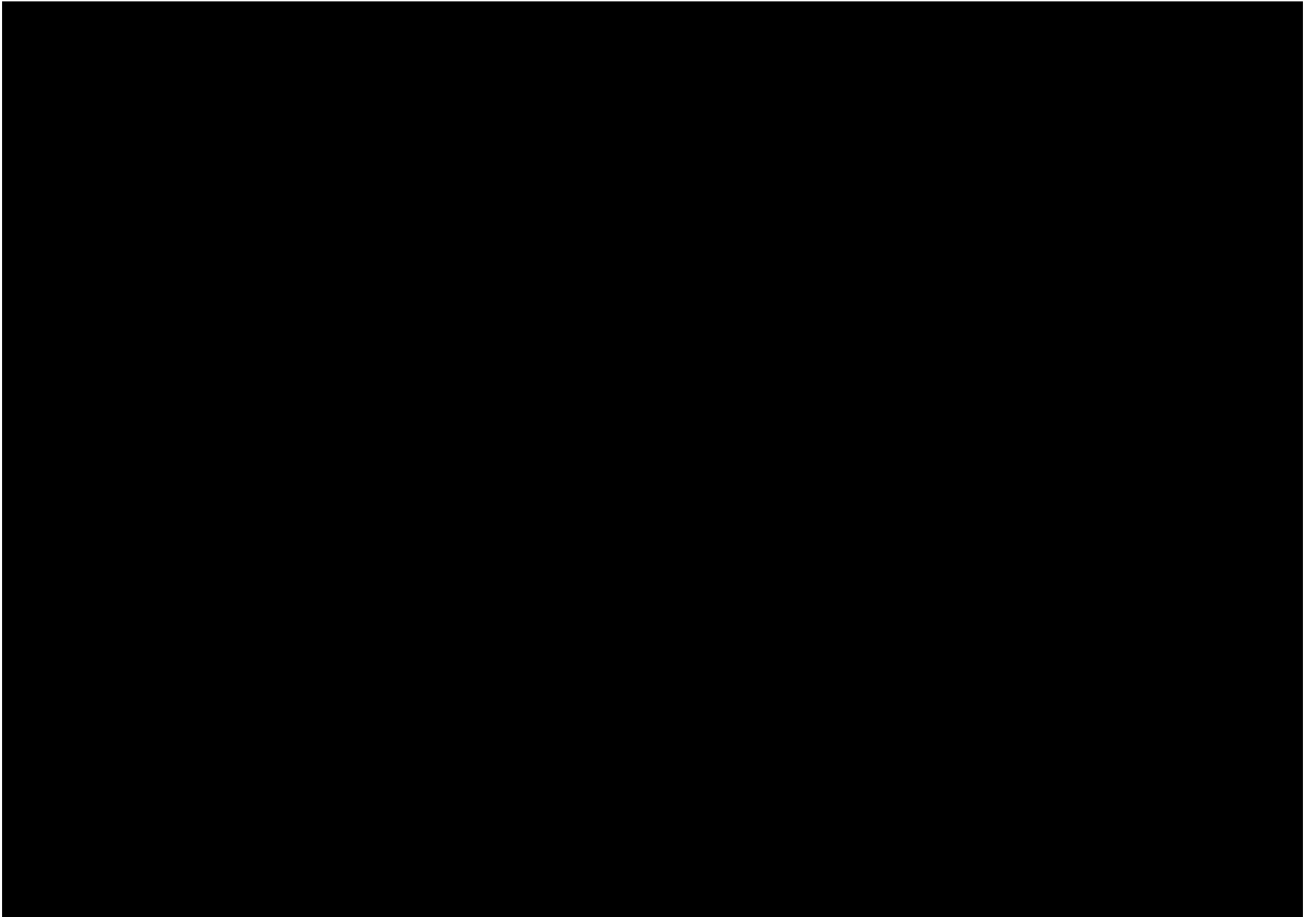


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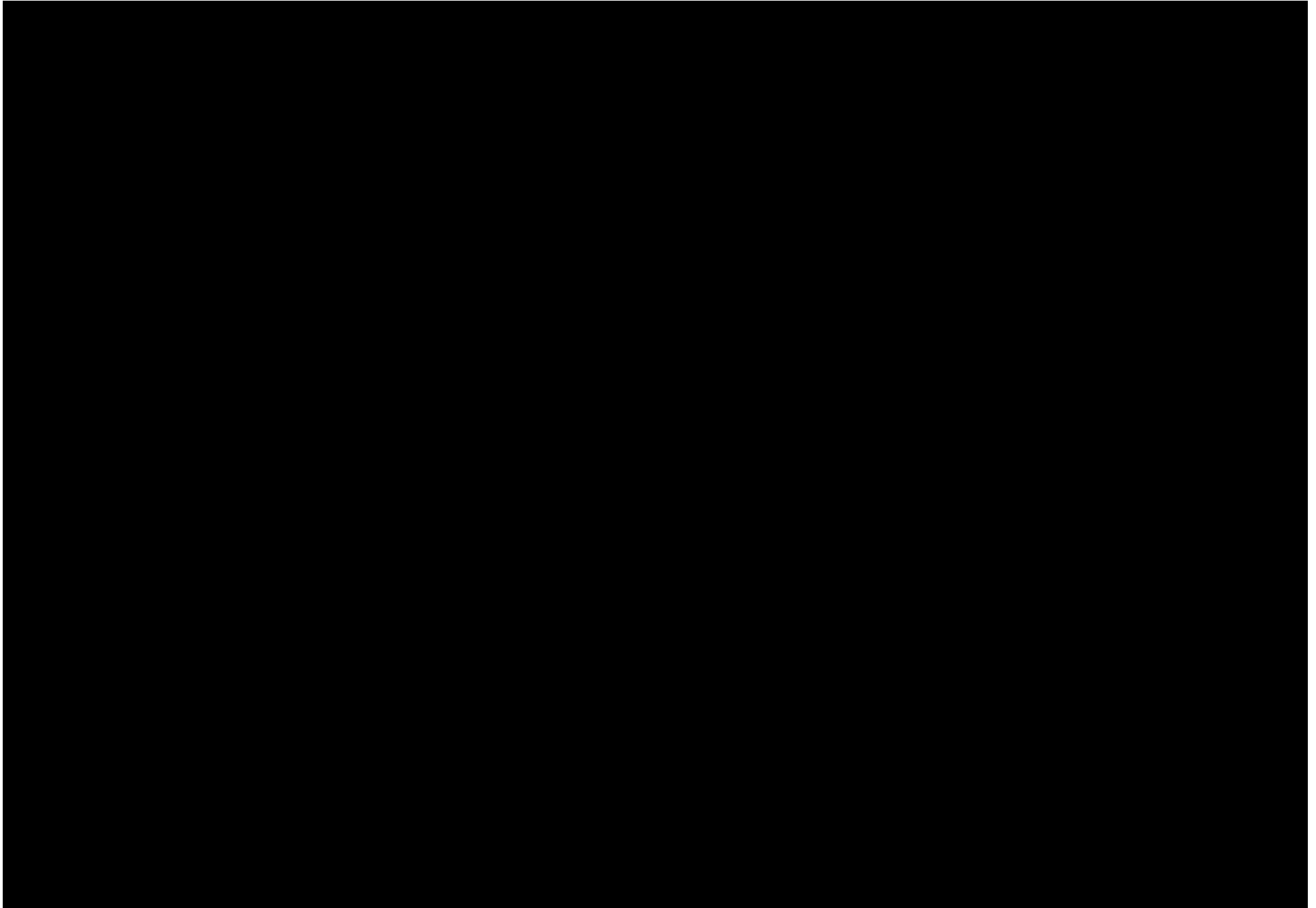


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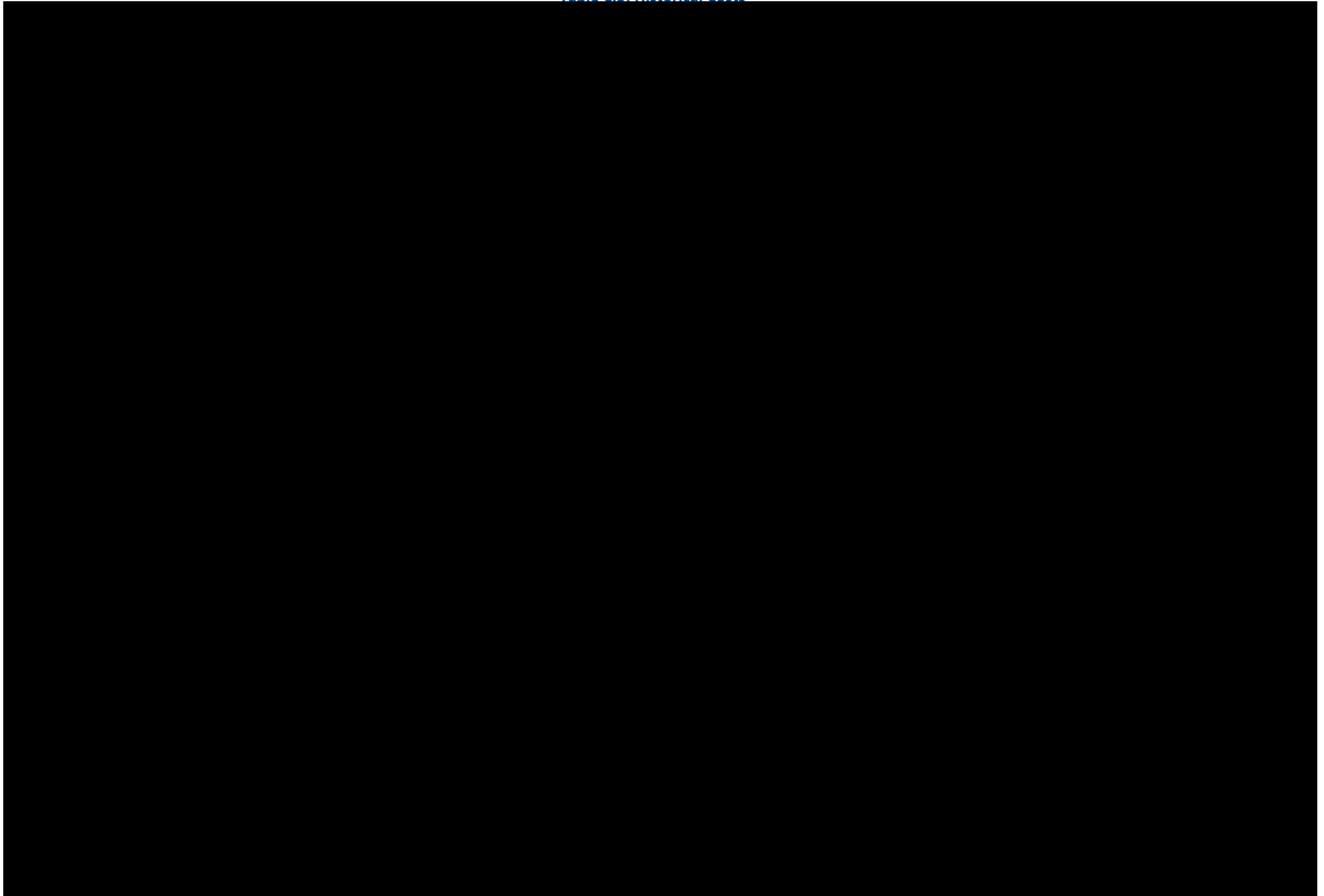


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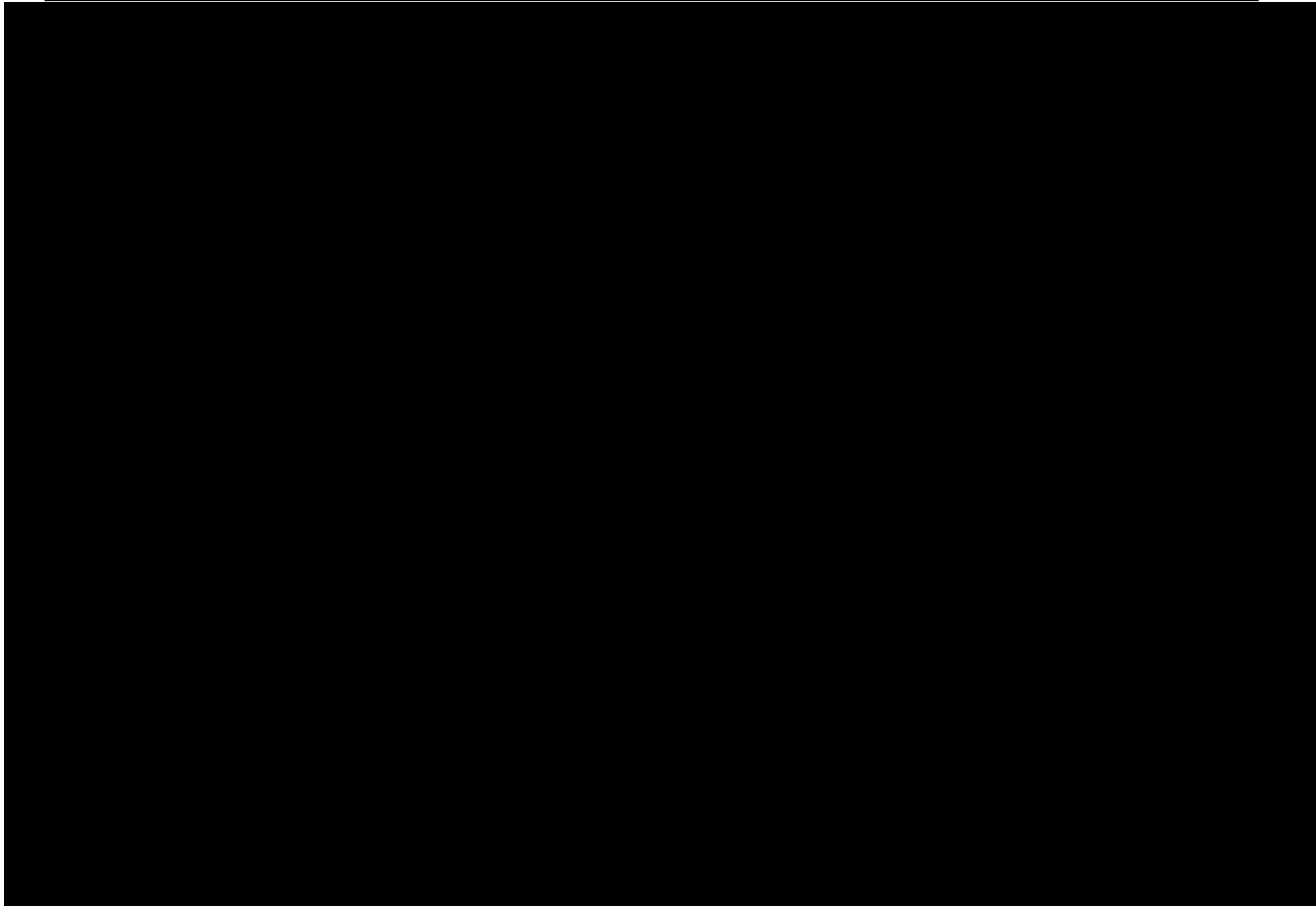


Table C.5: Historical Costs



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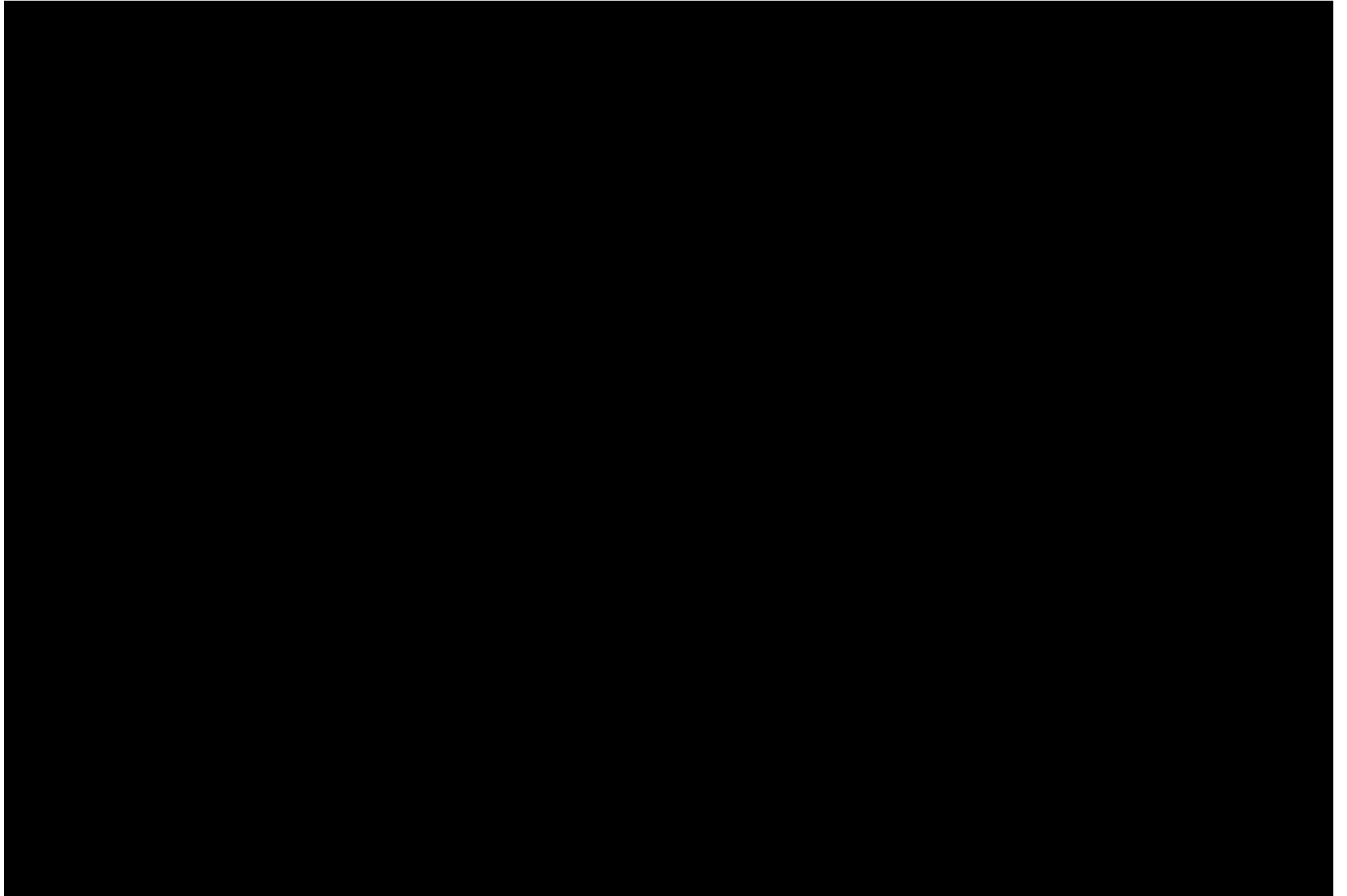


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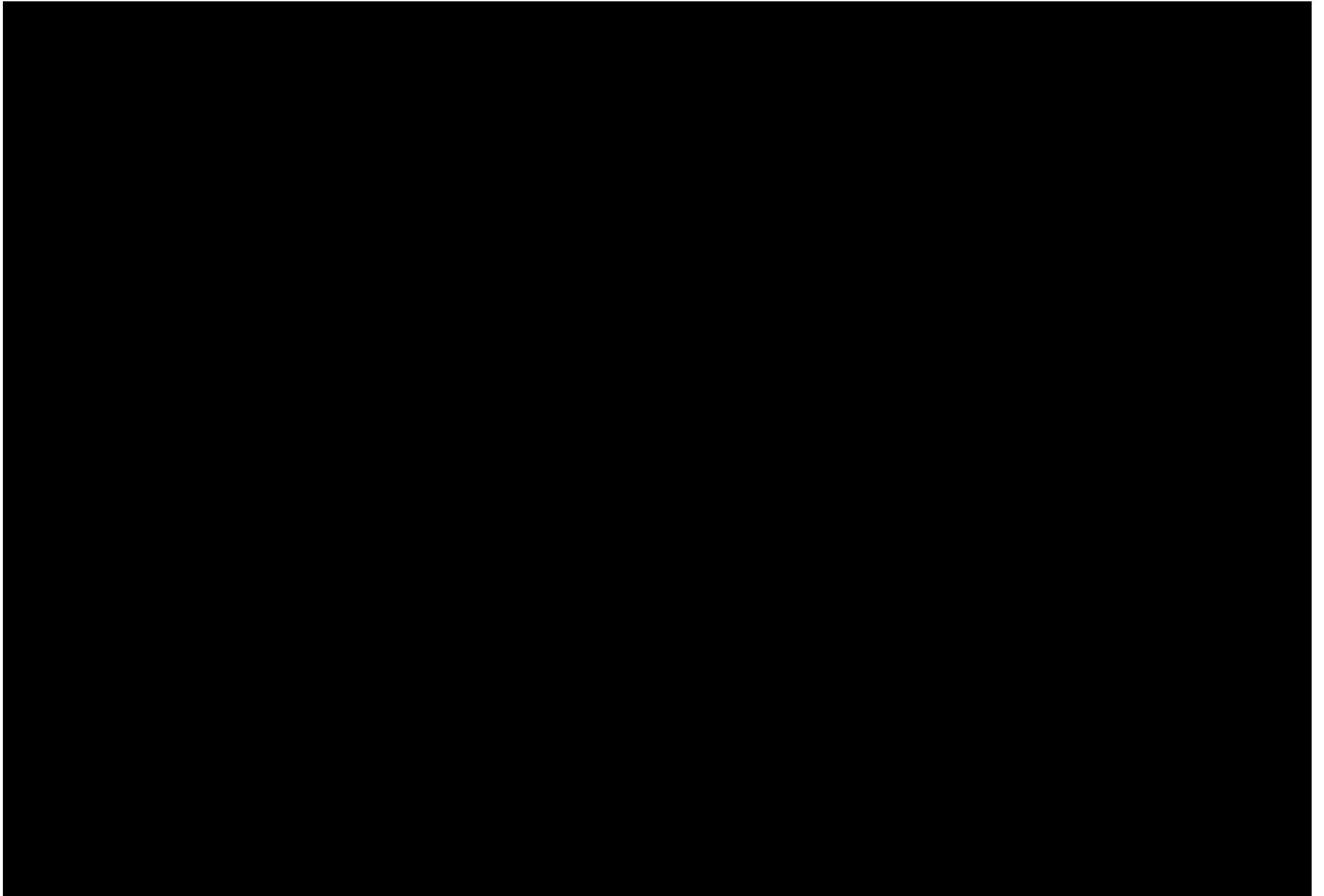


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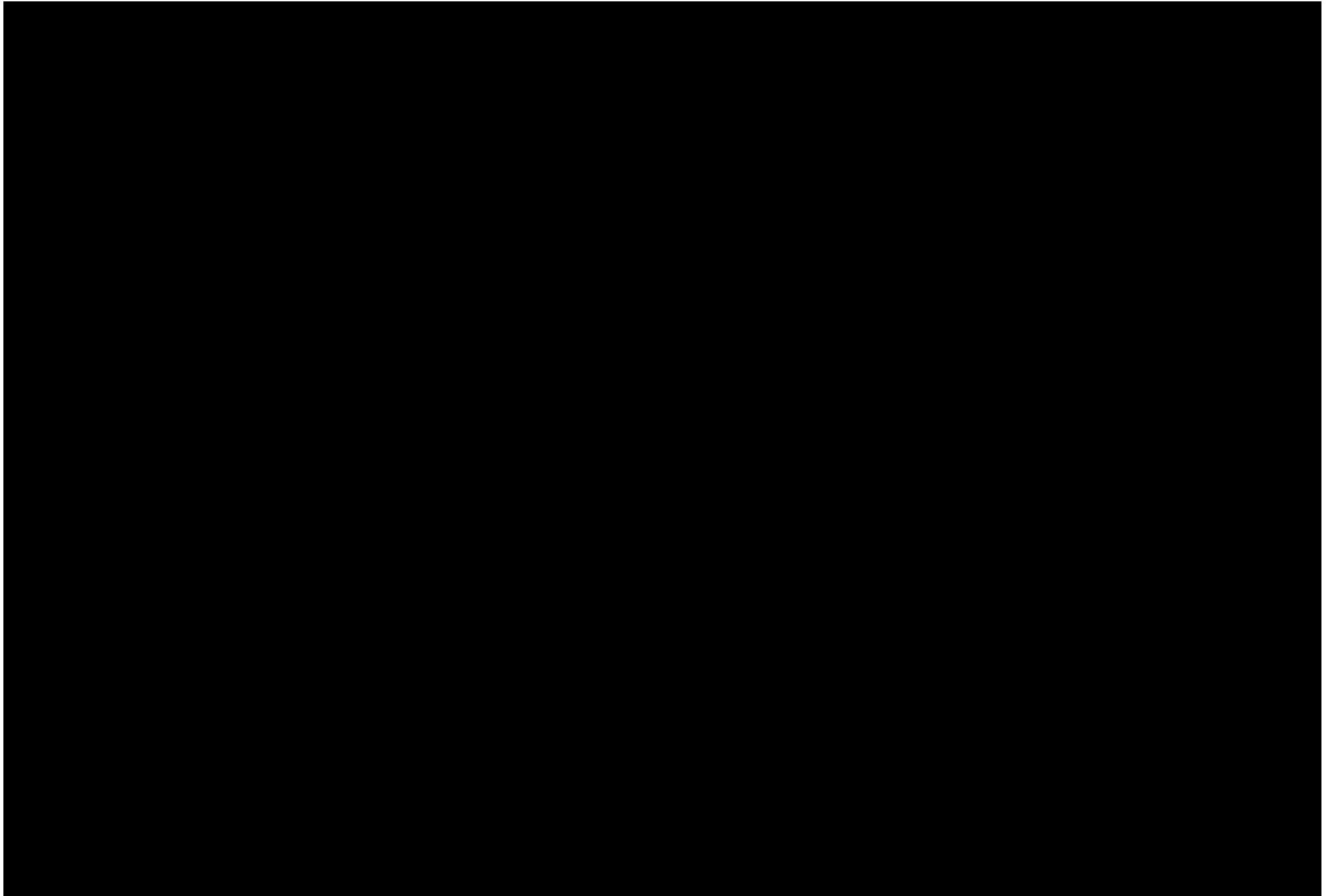


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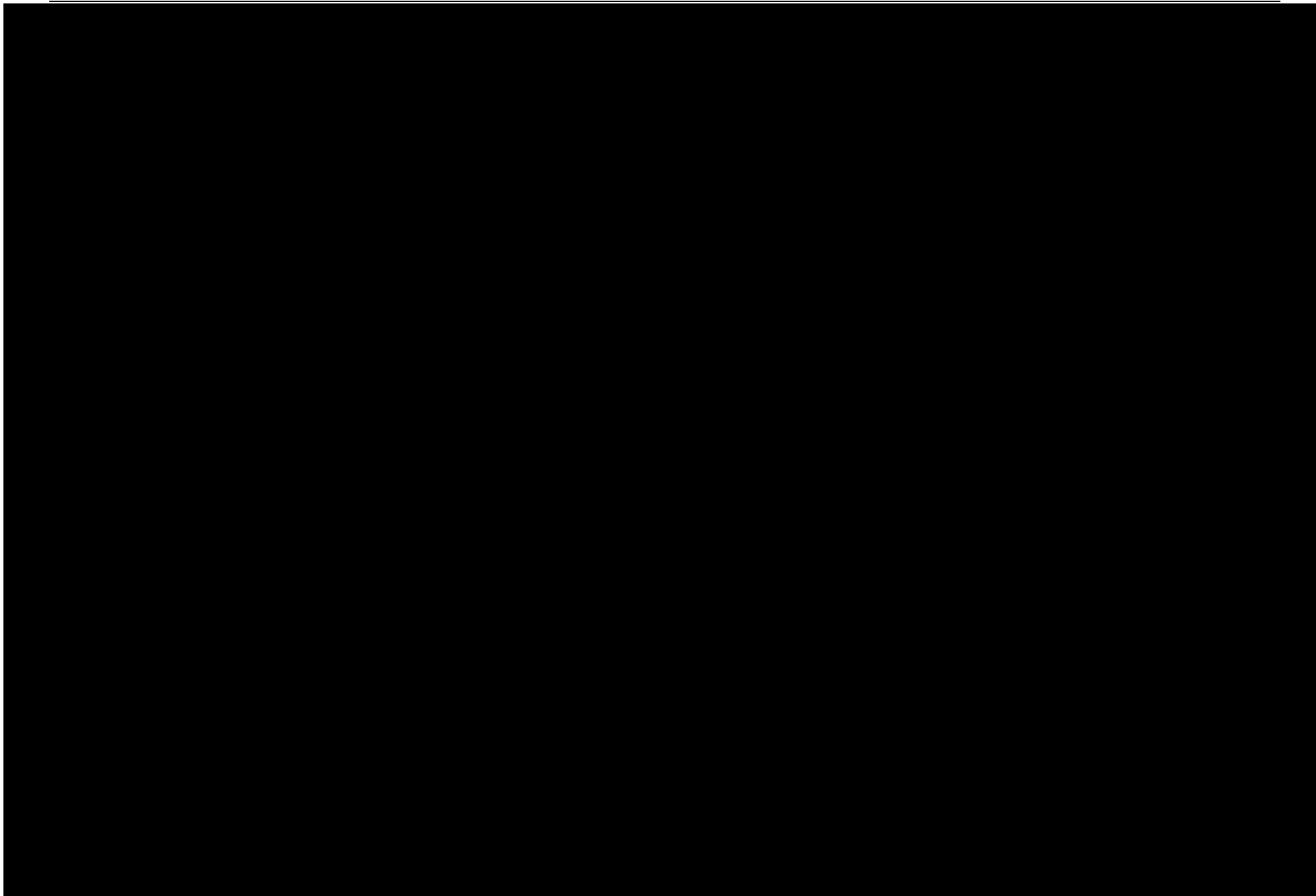


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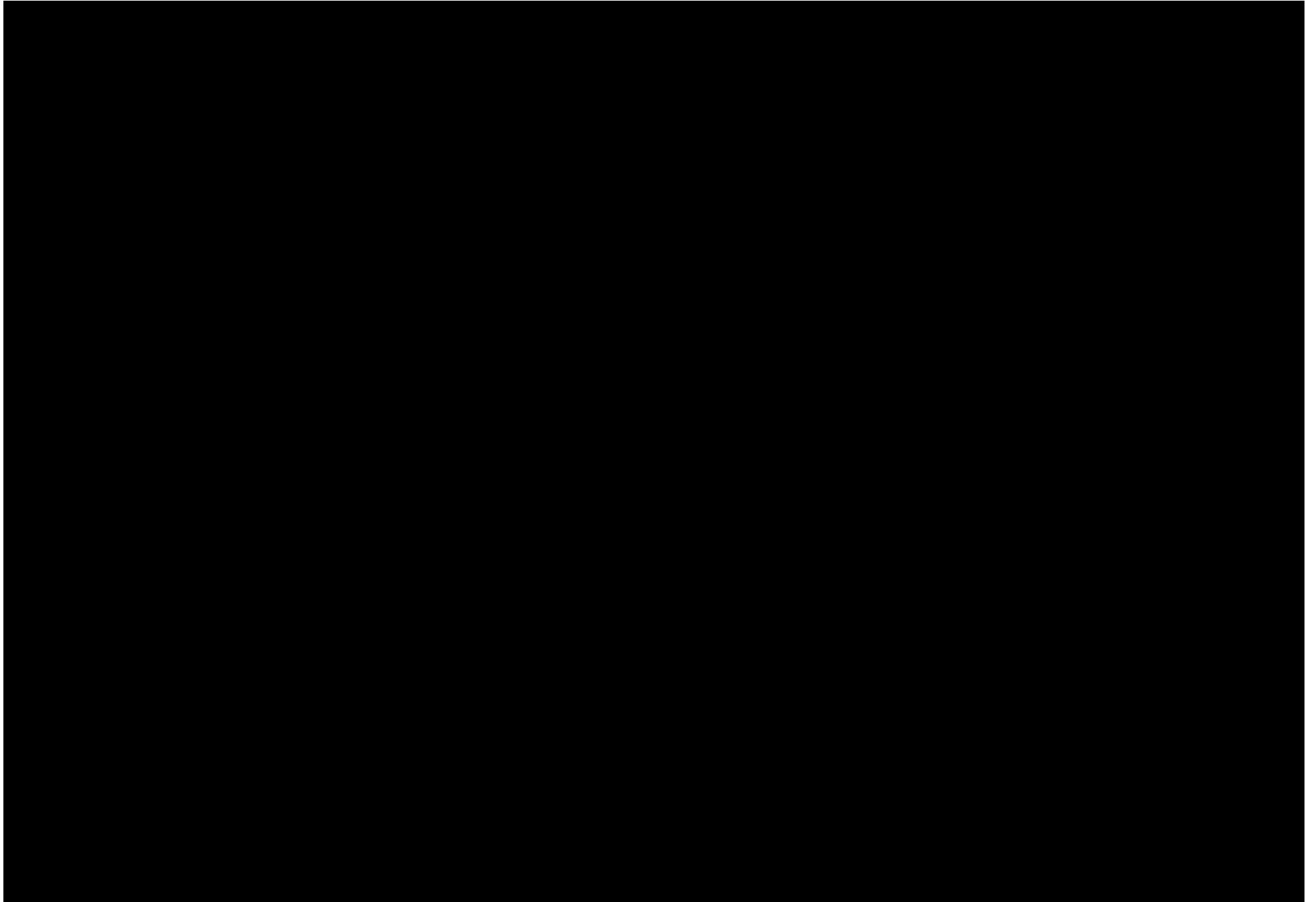


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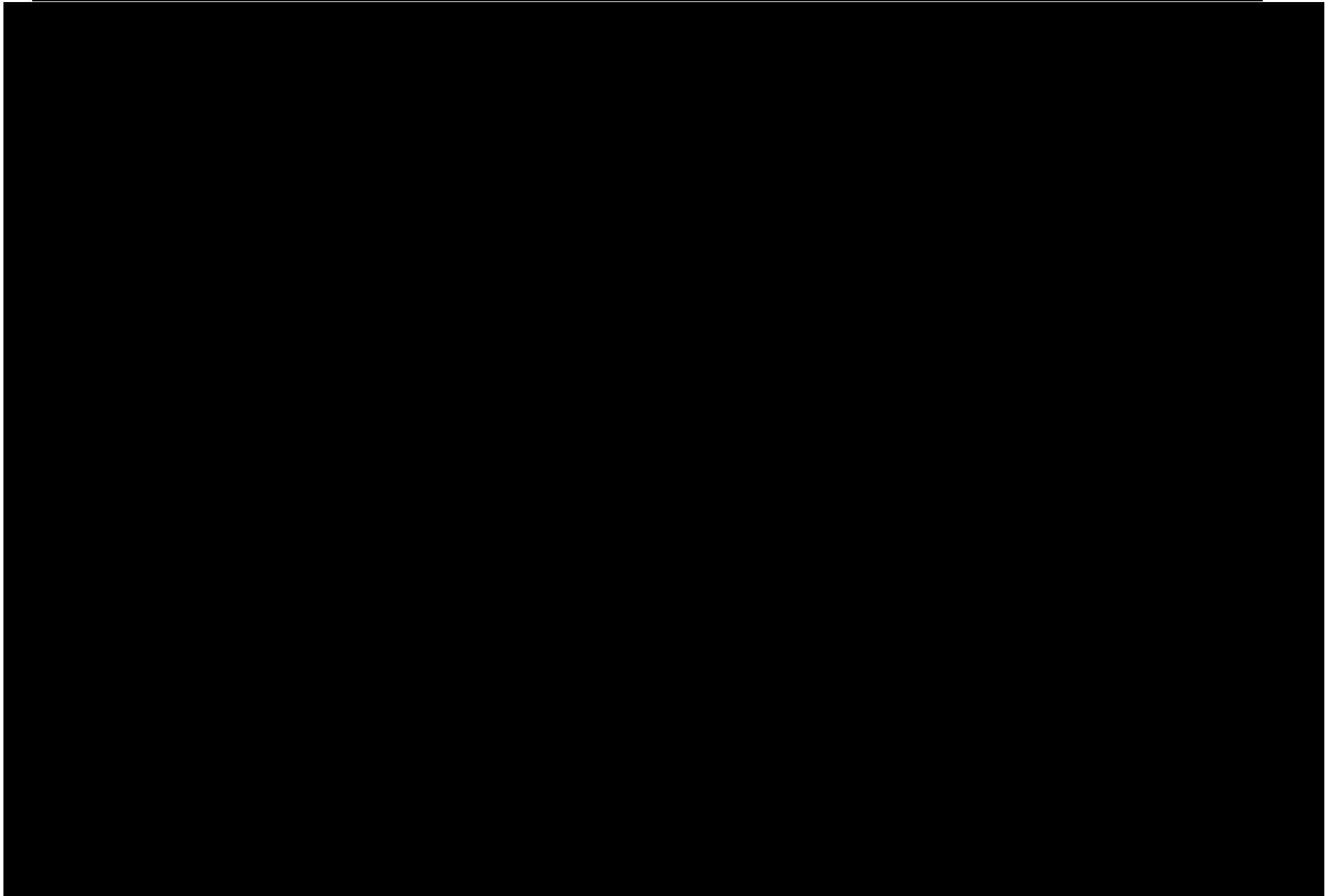


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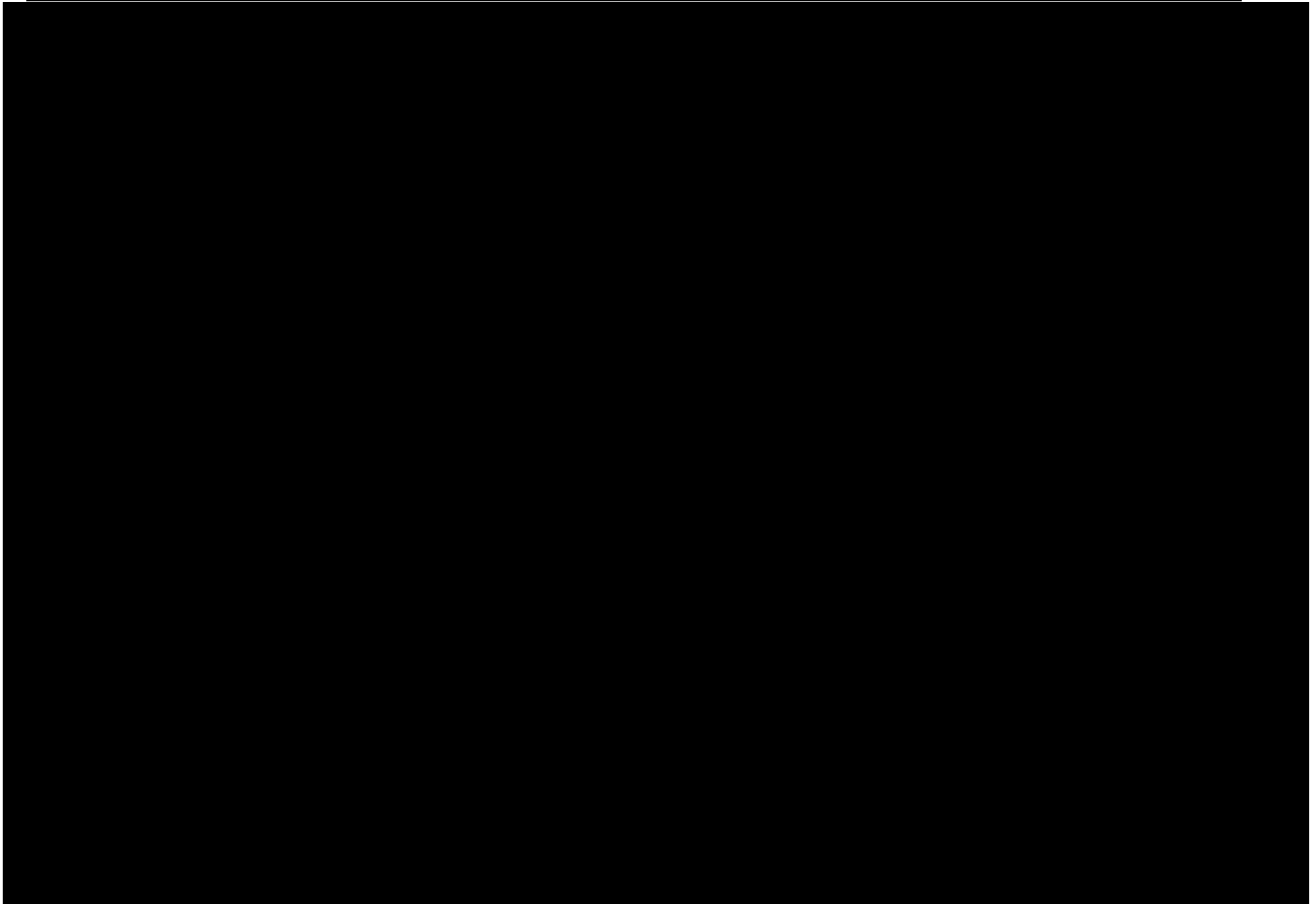


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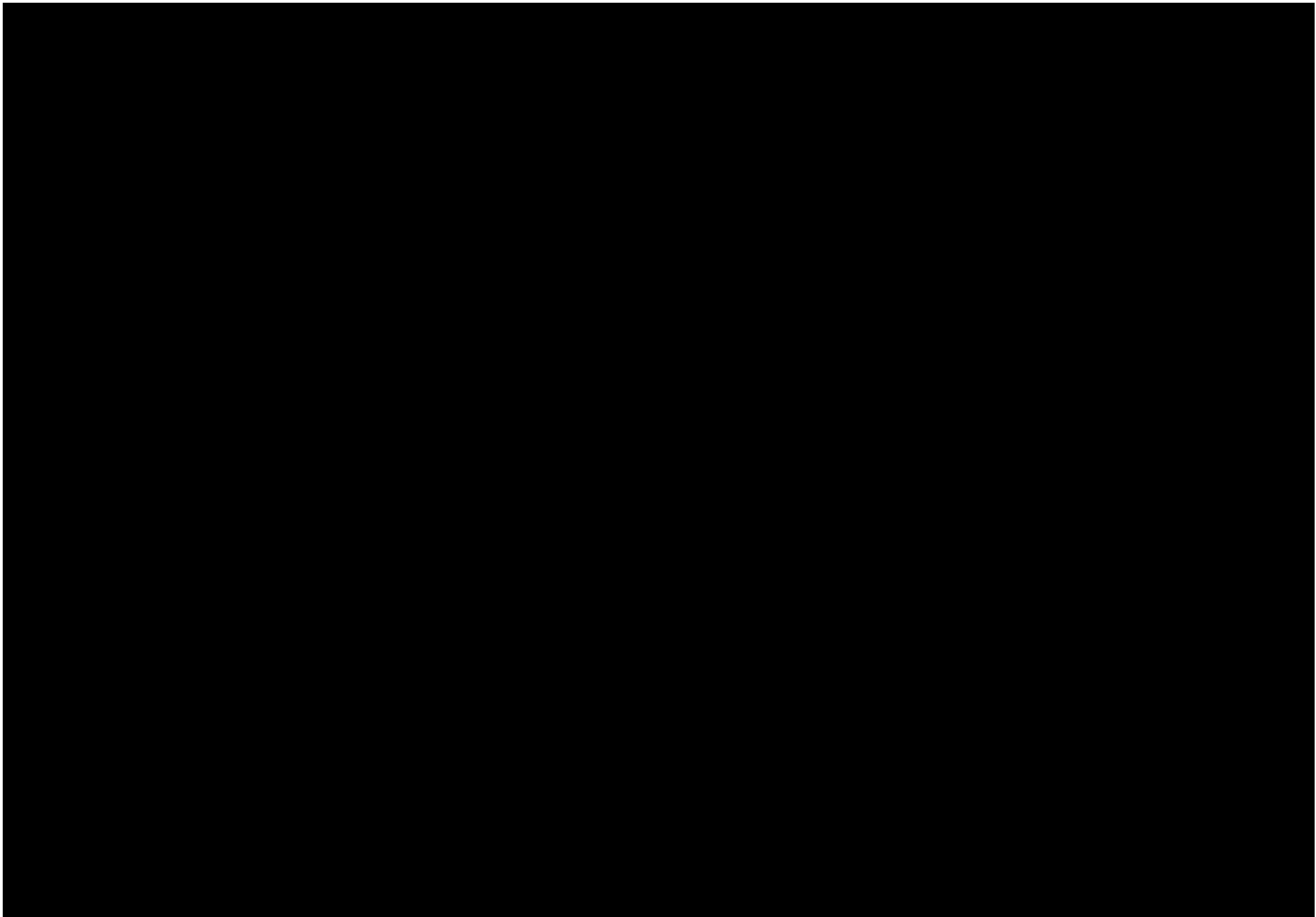


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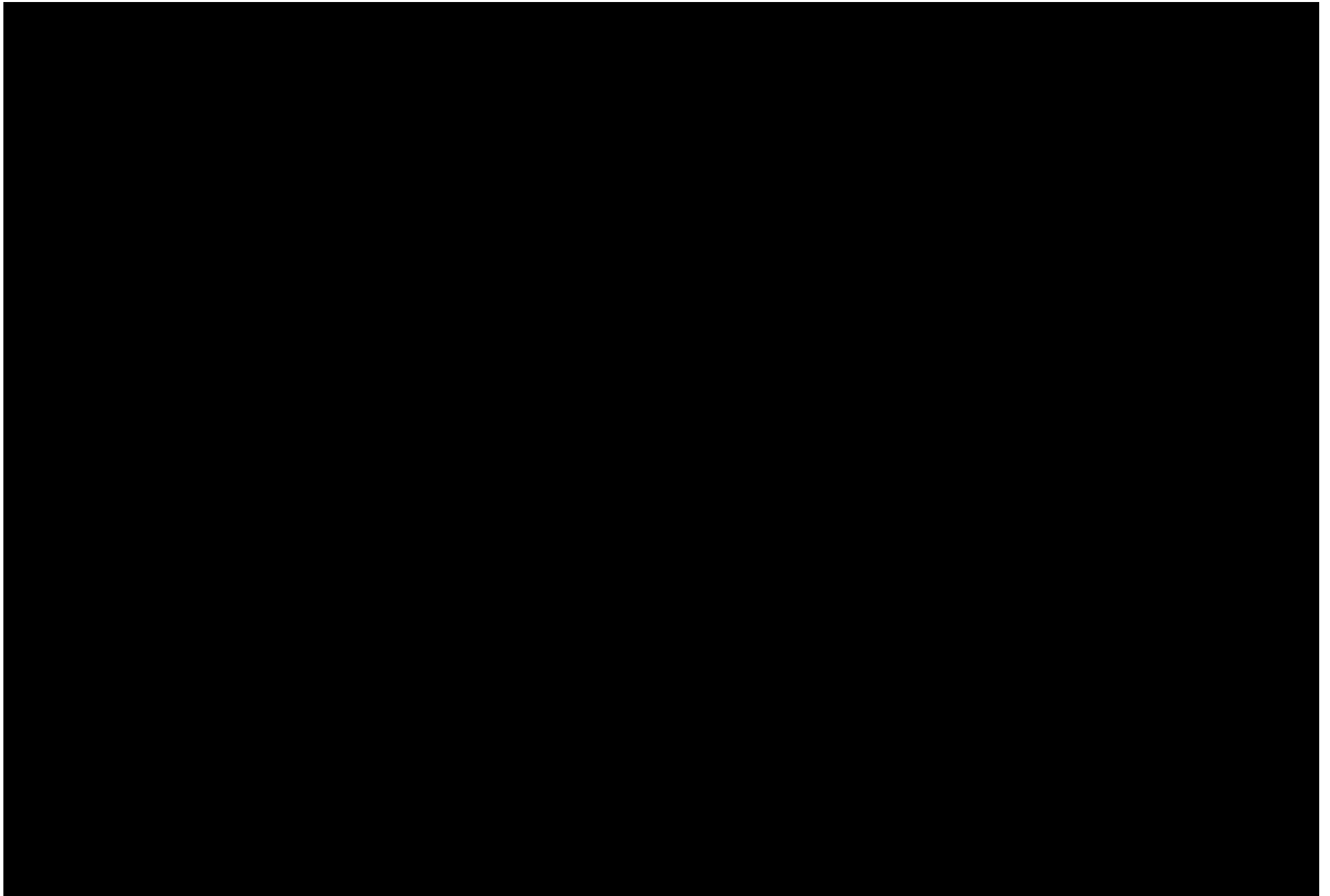


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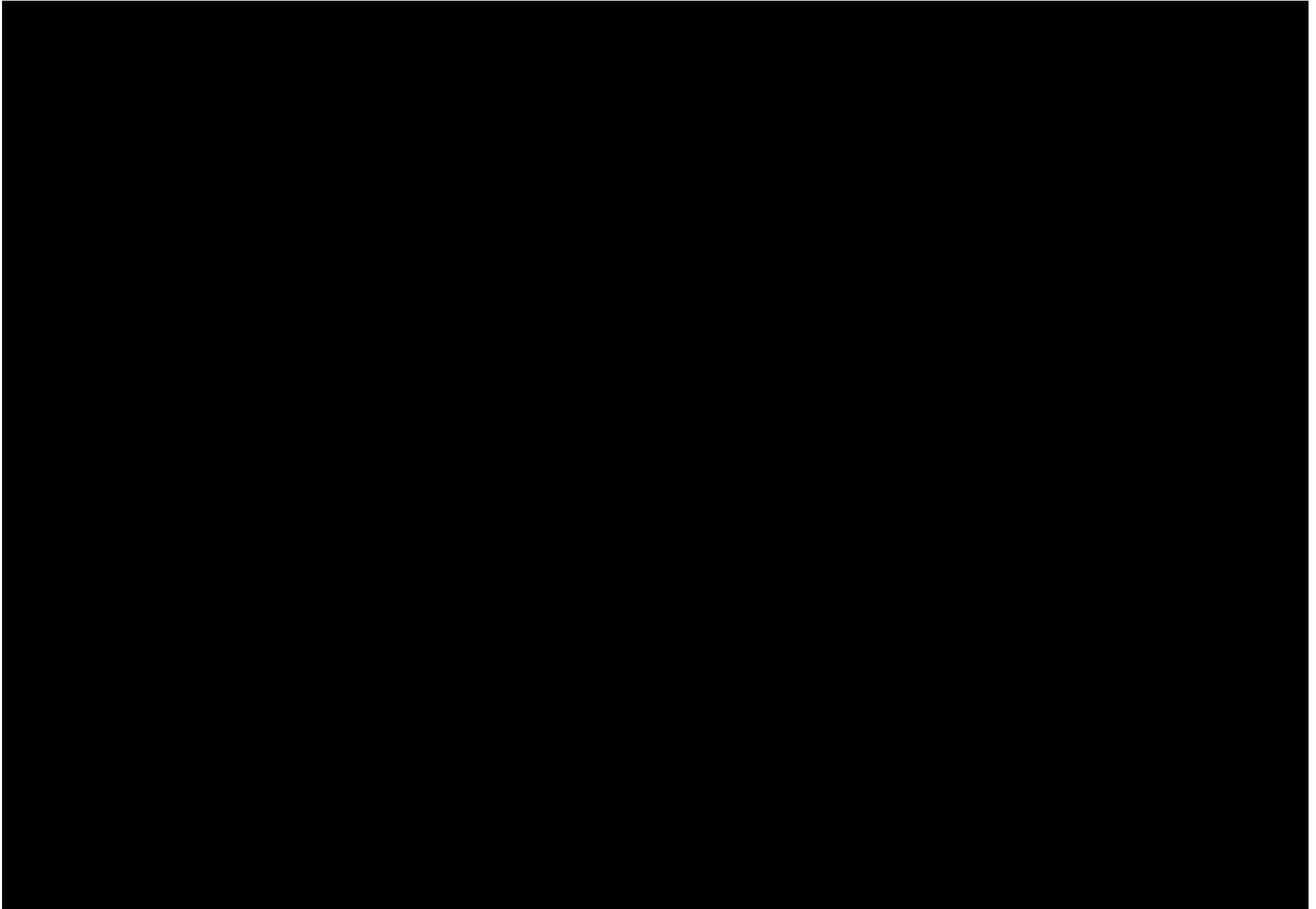


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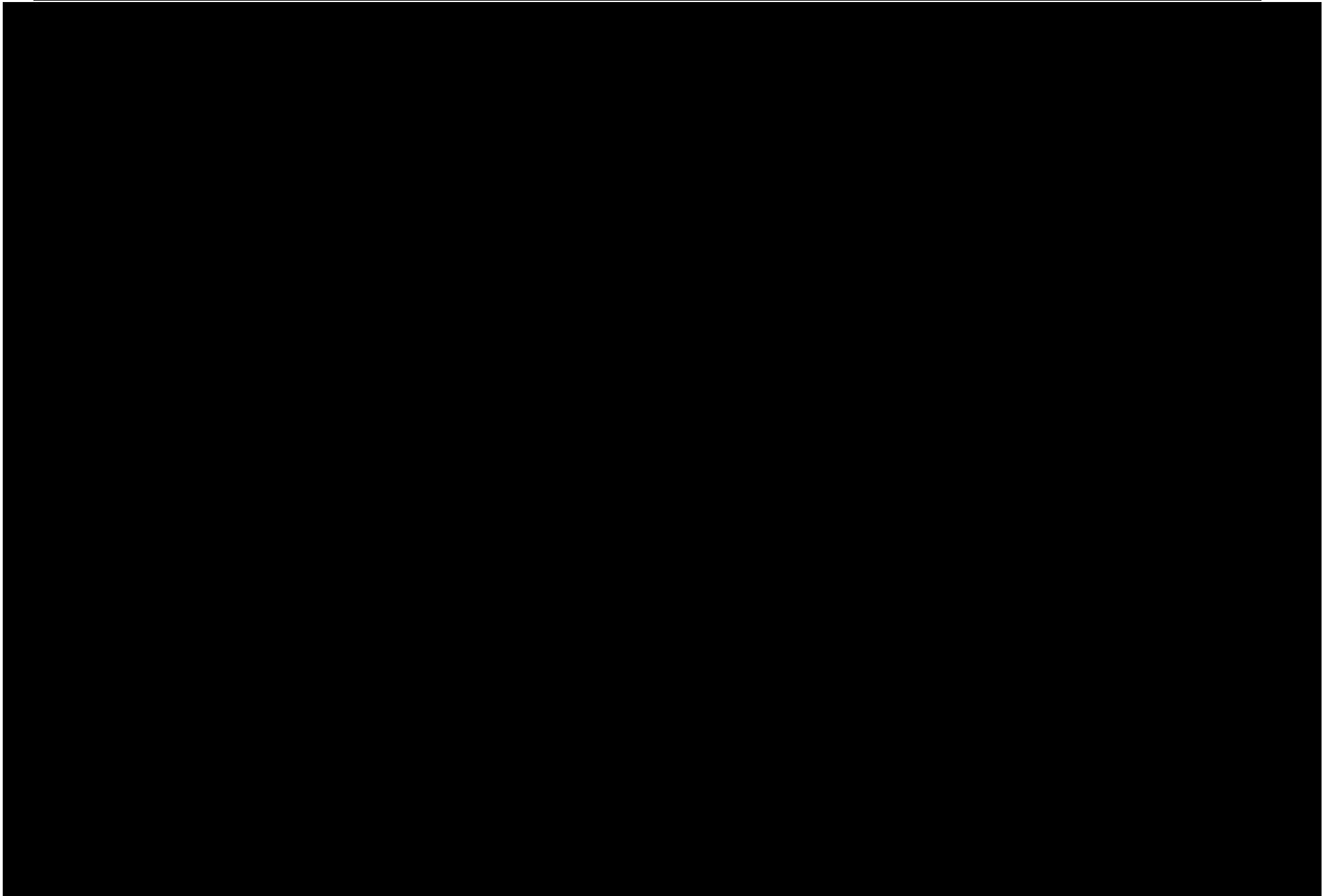
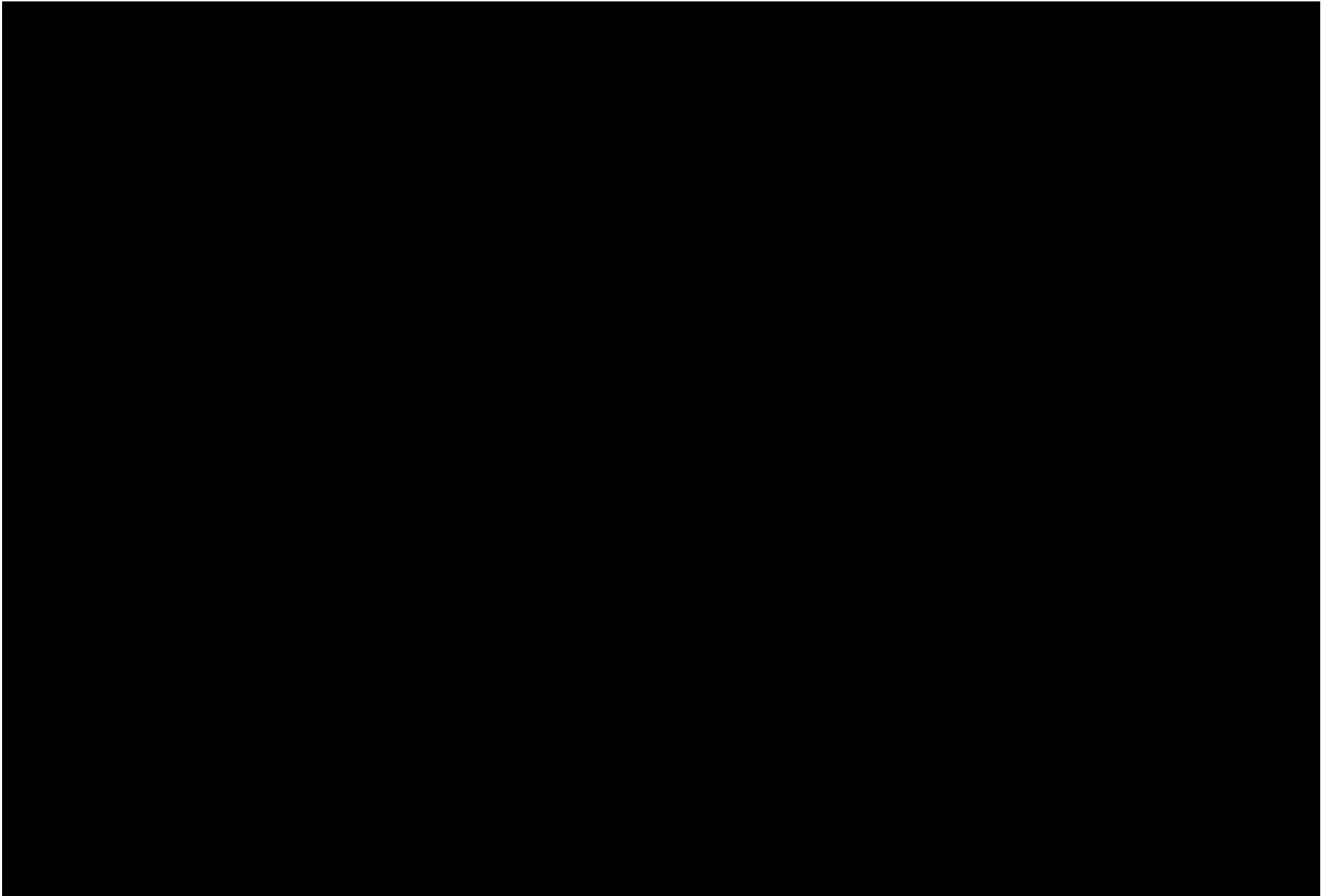


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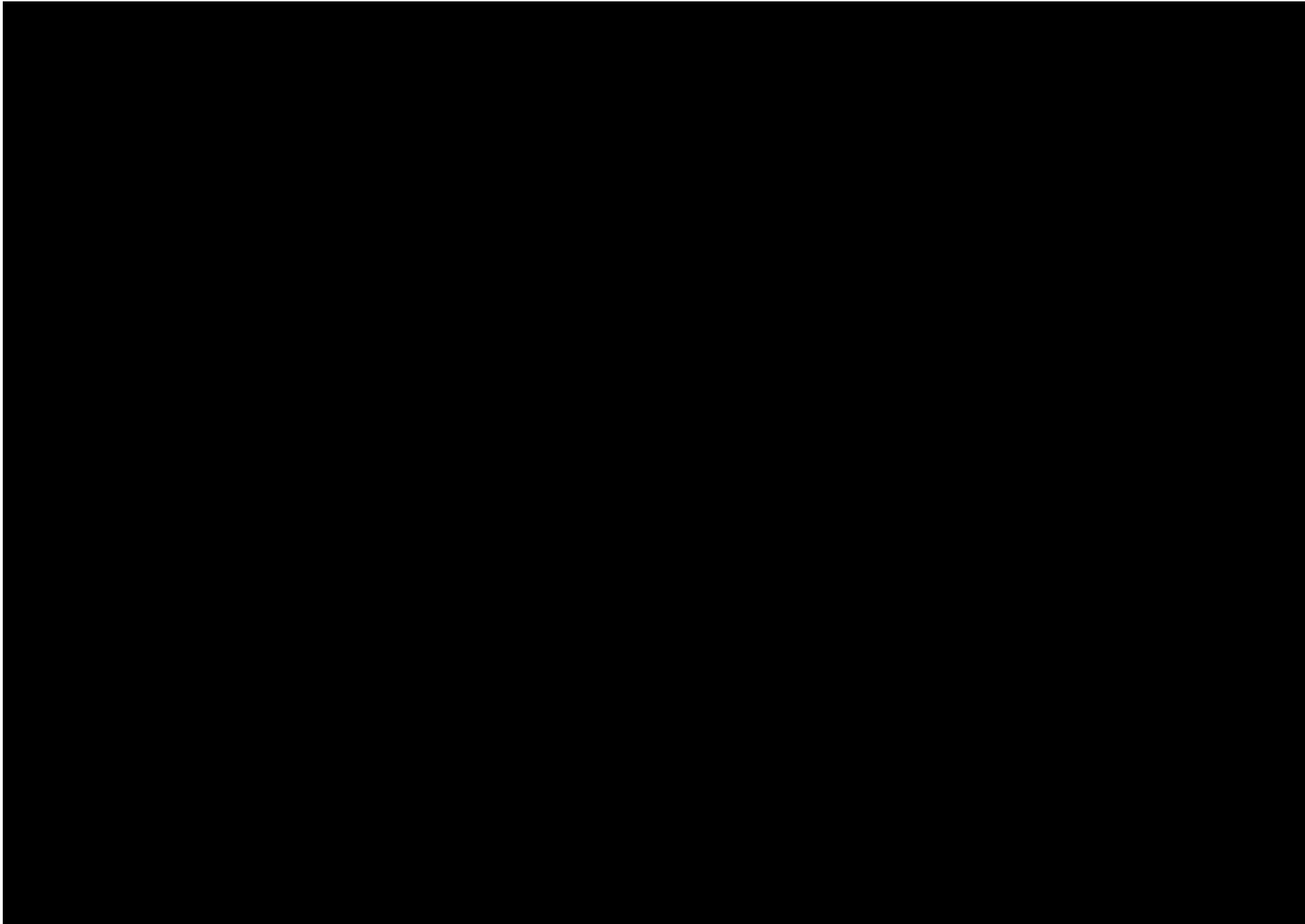


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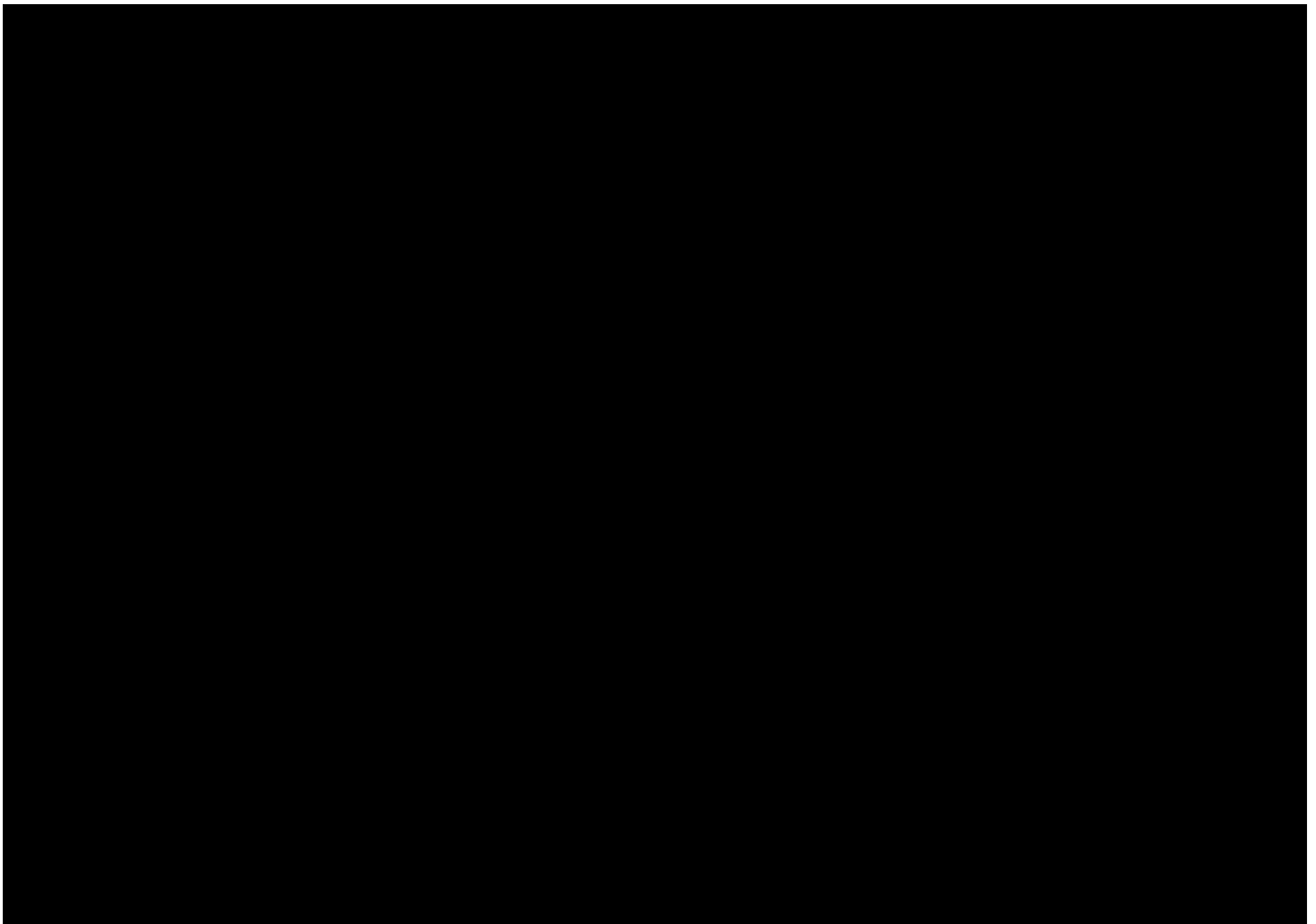


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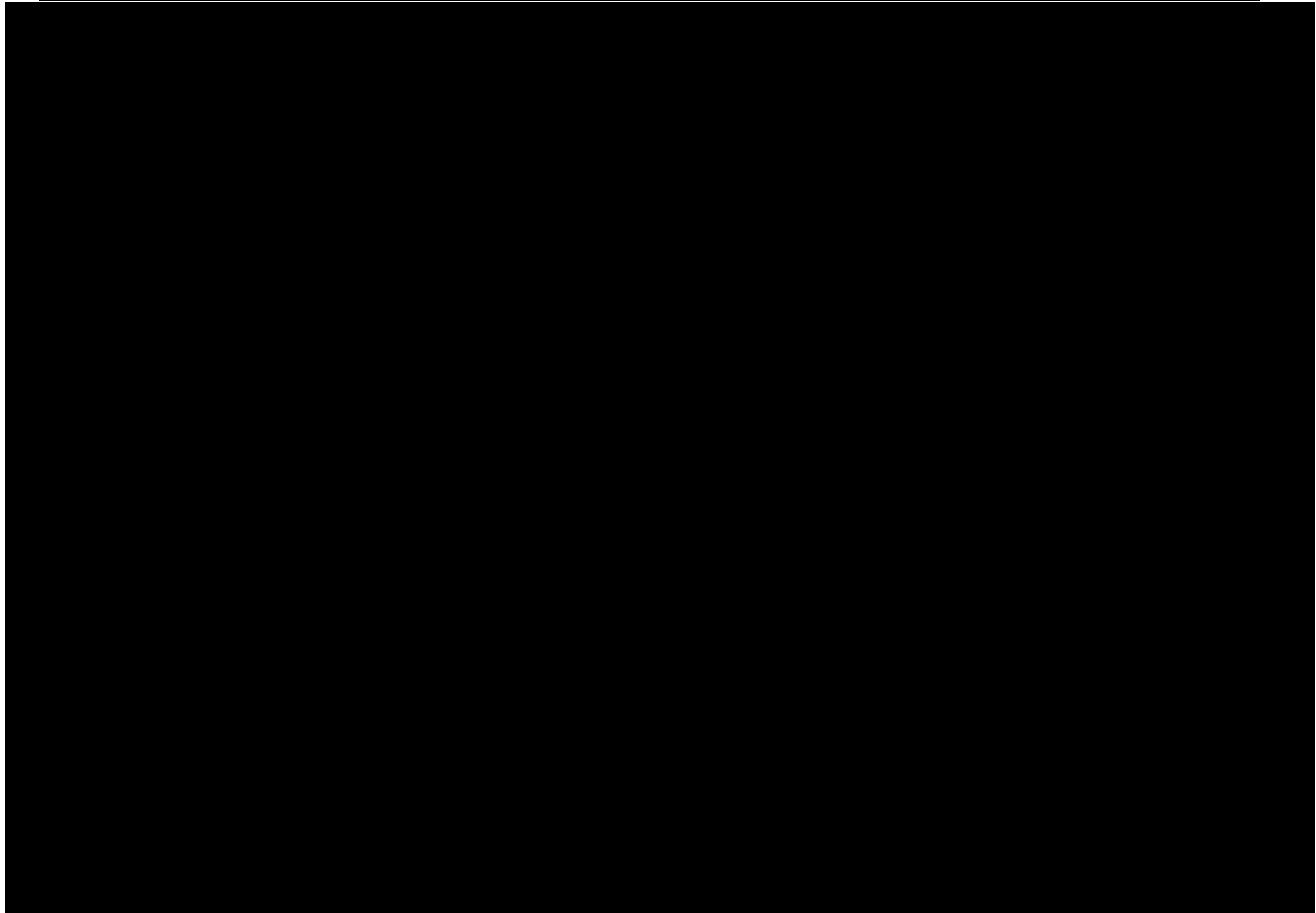


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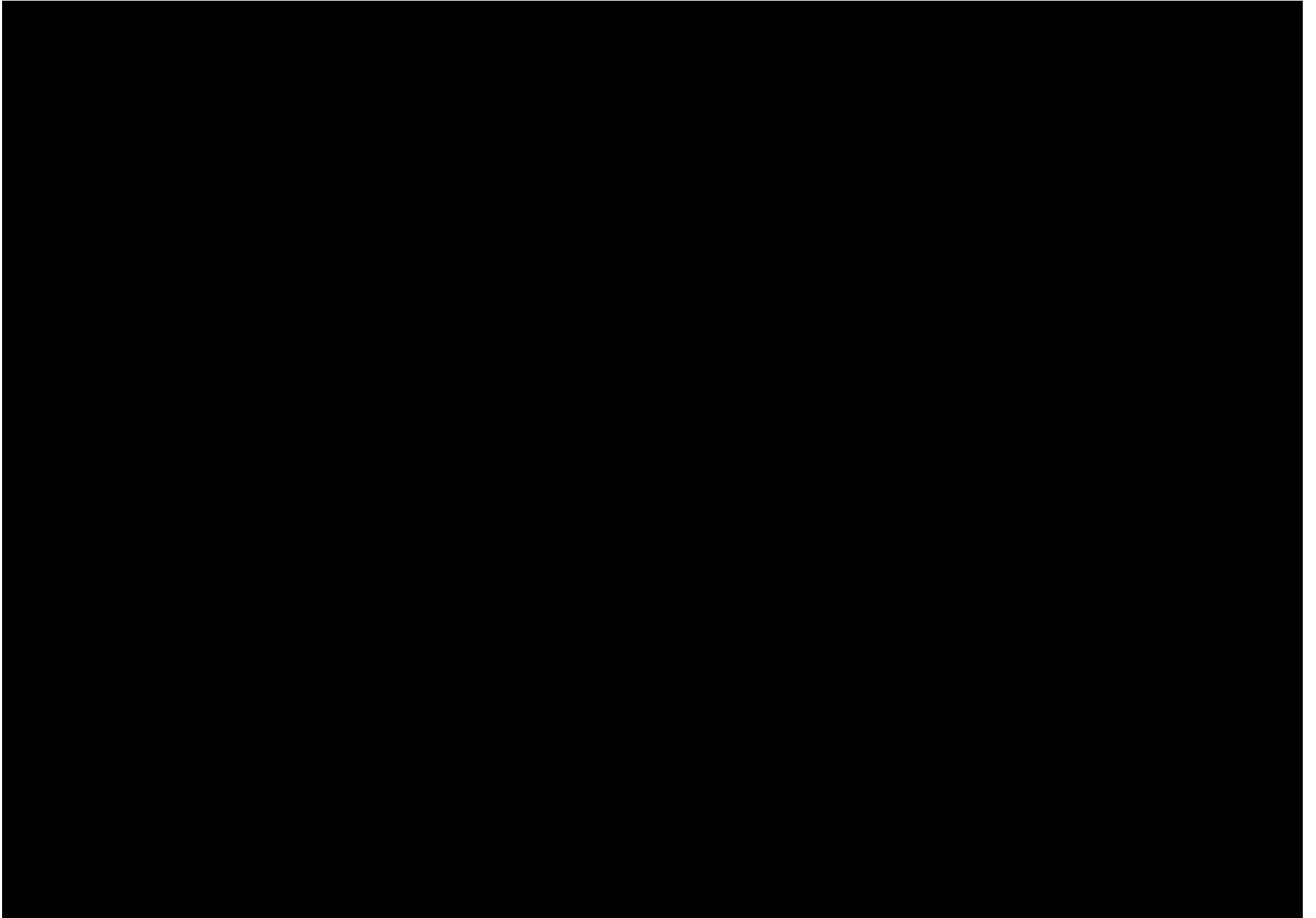


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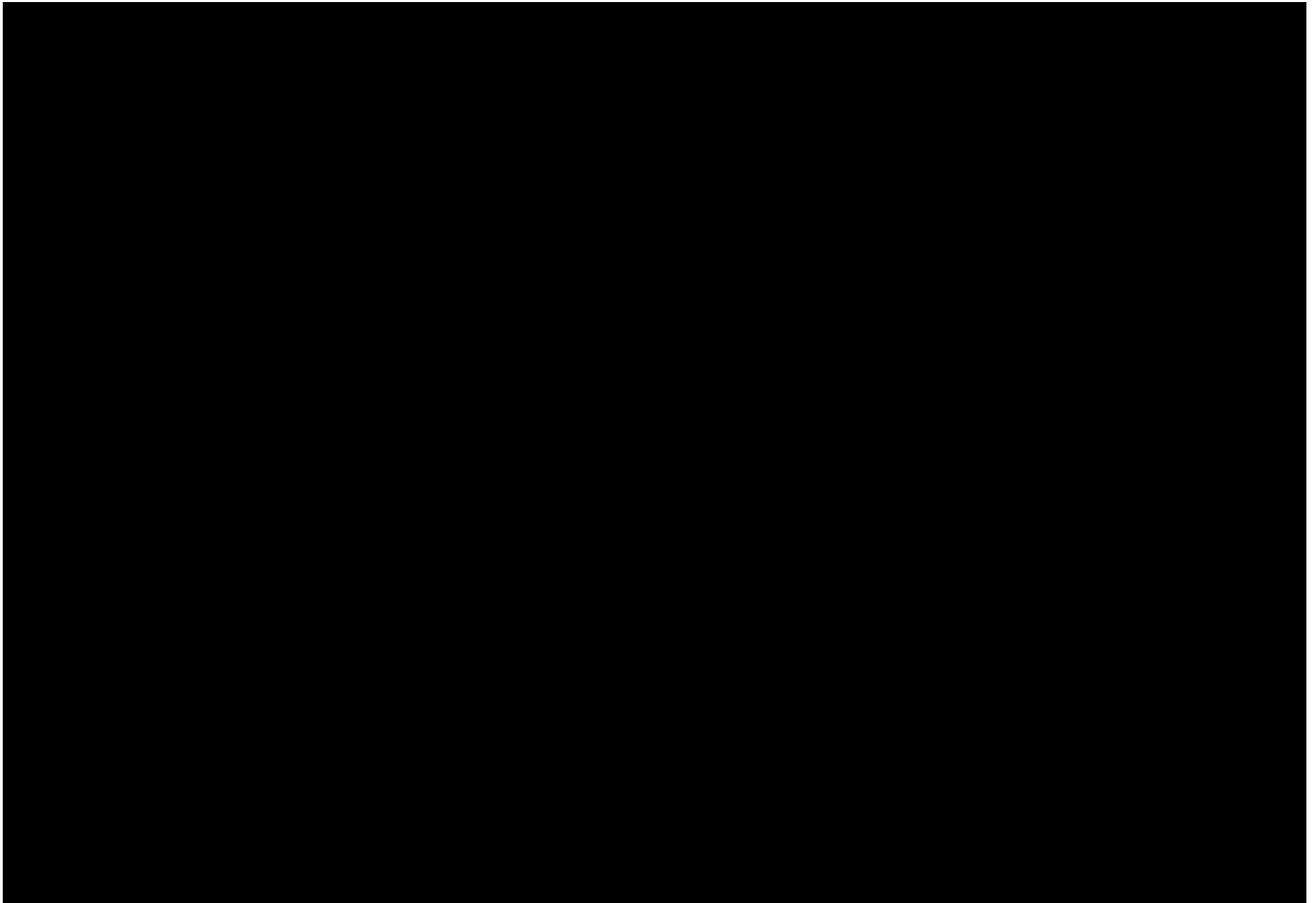


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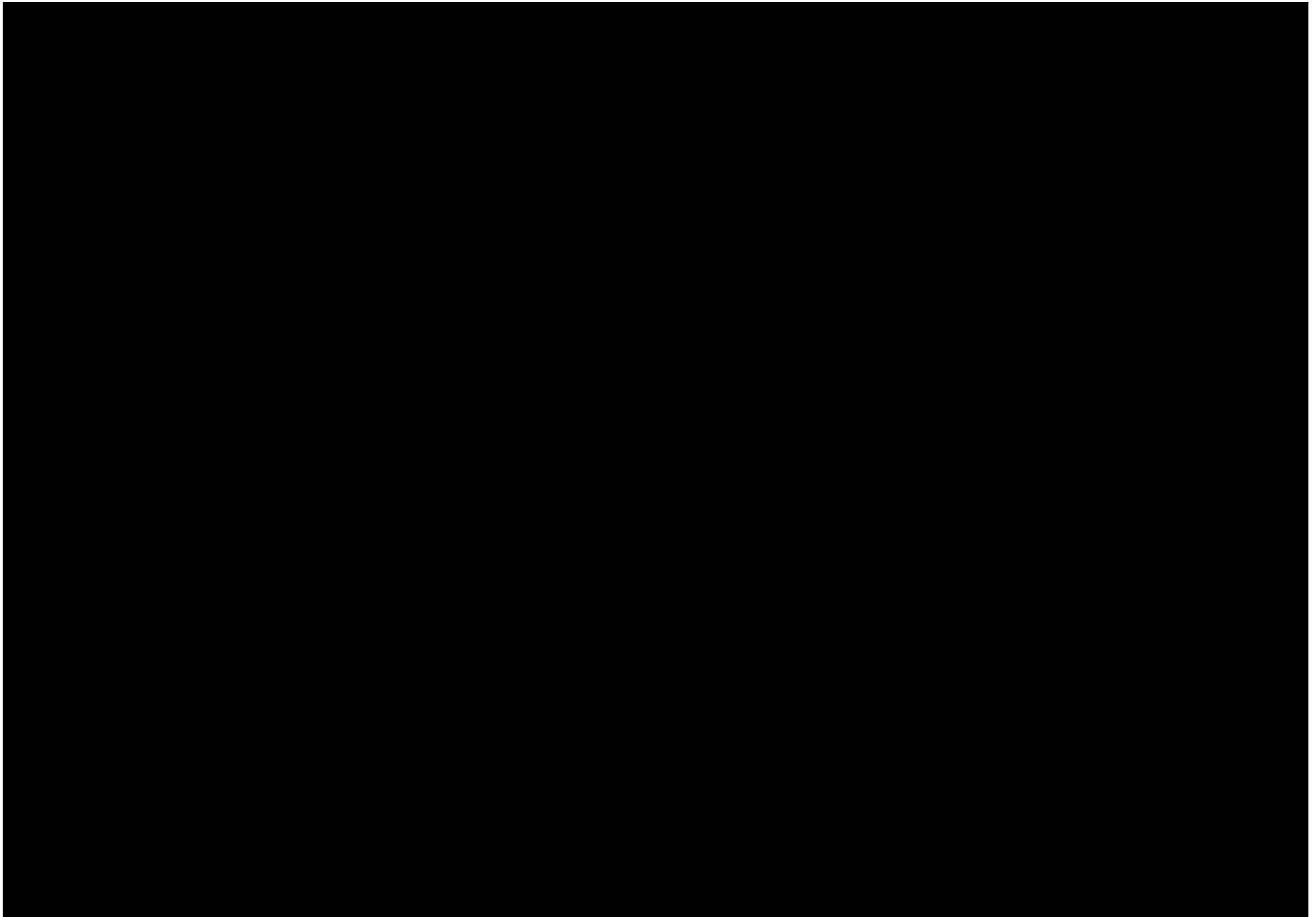


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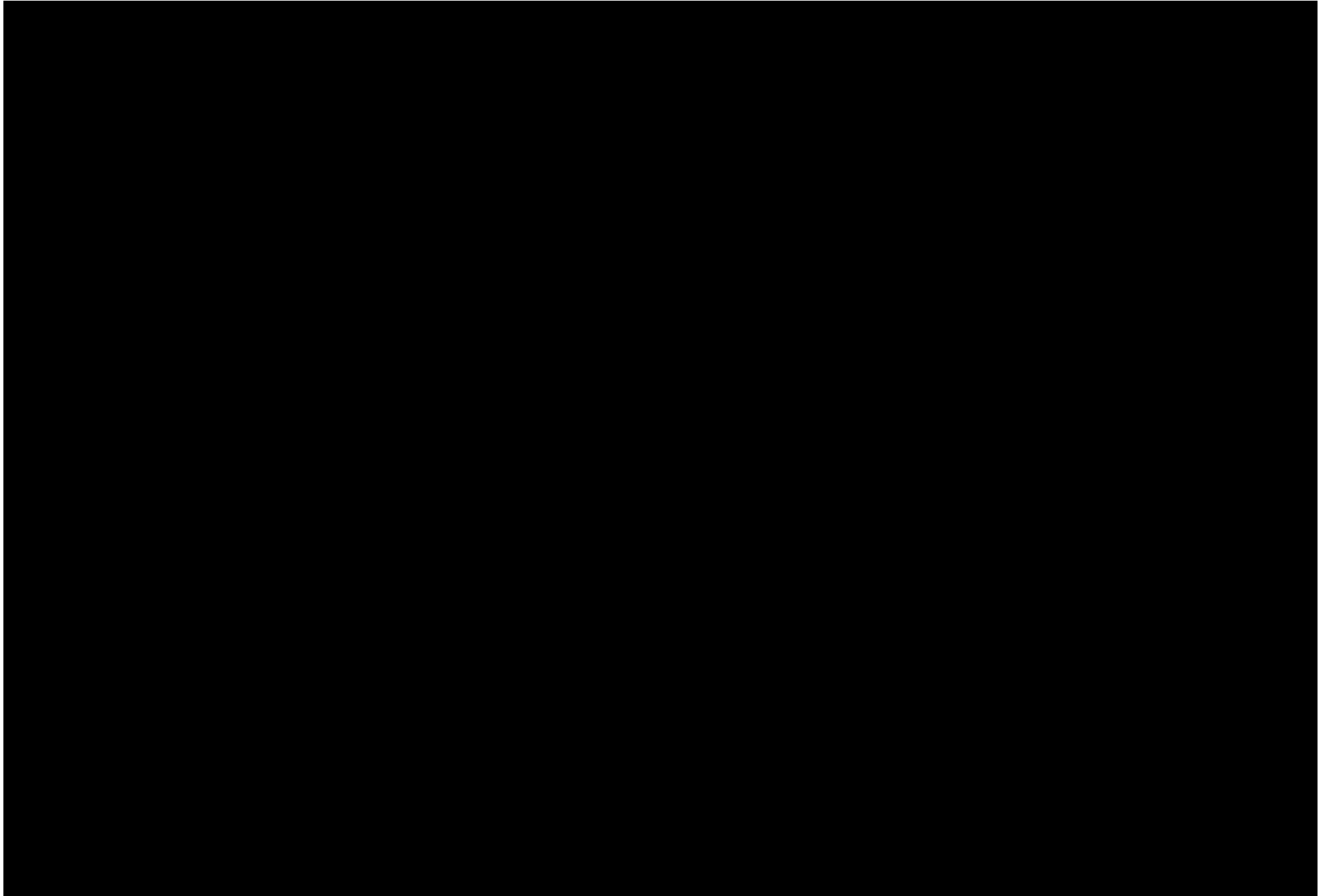


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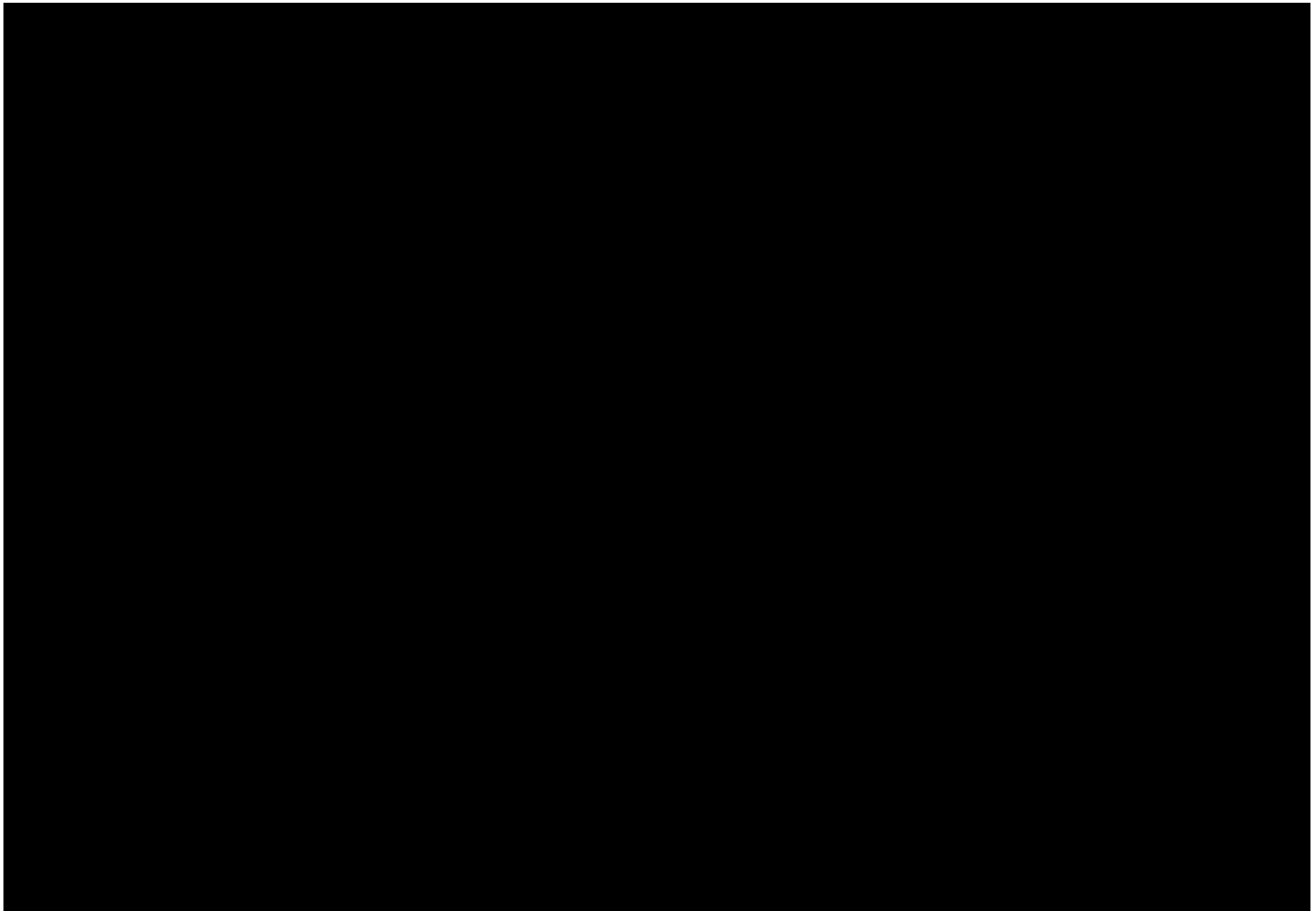


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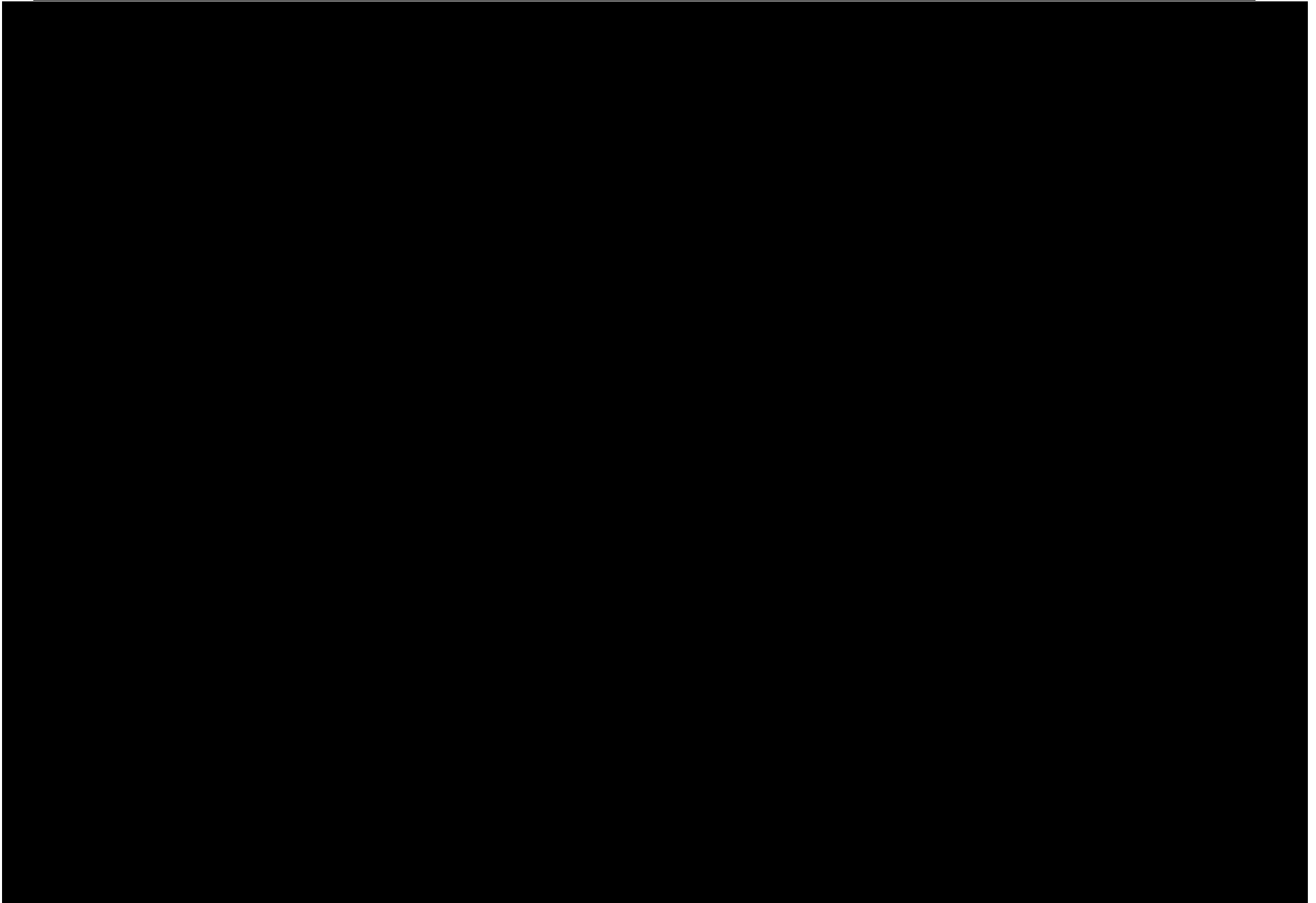


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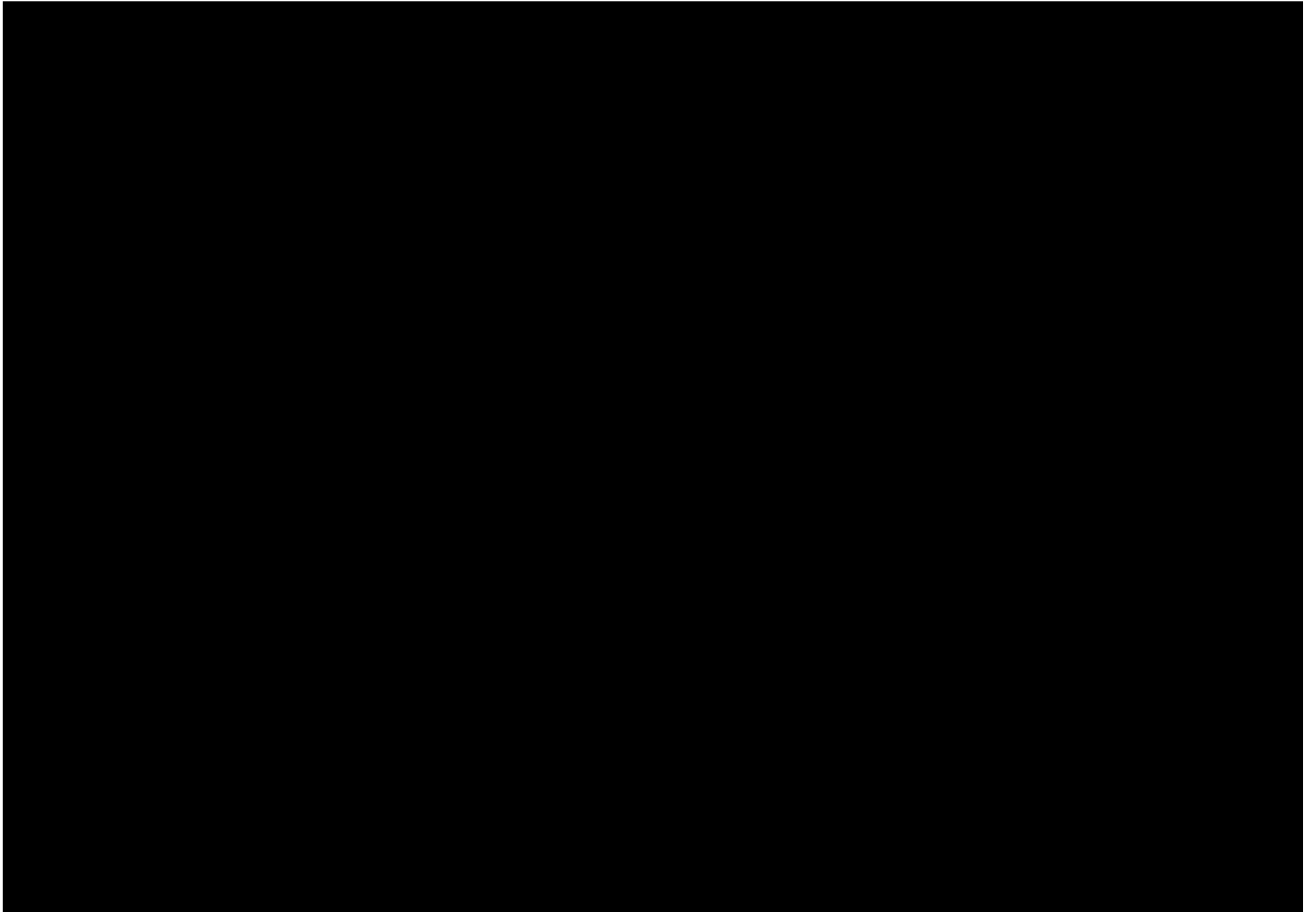


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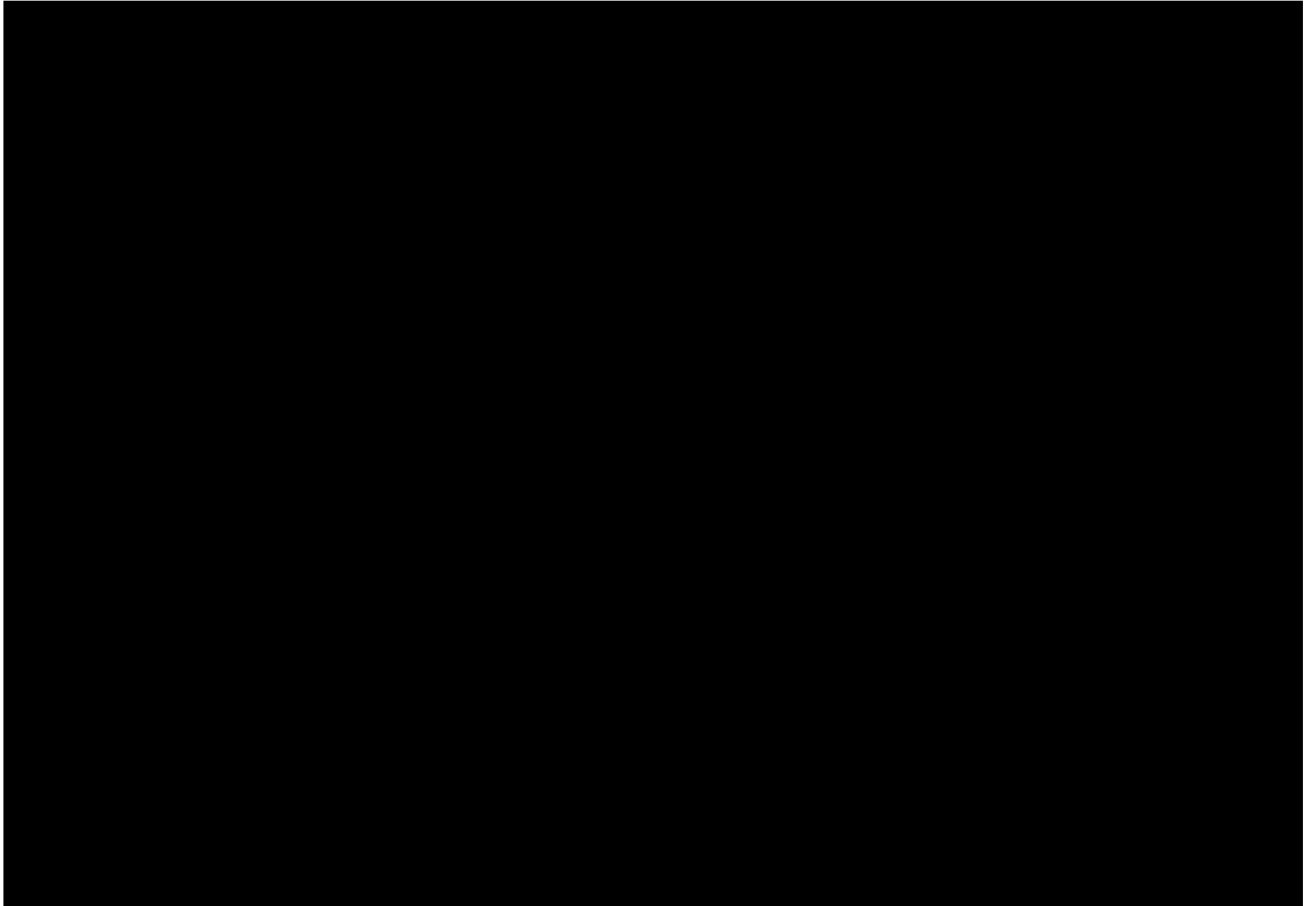


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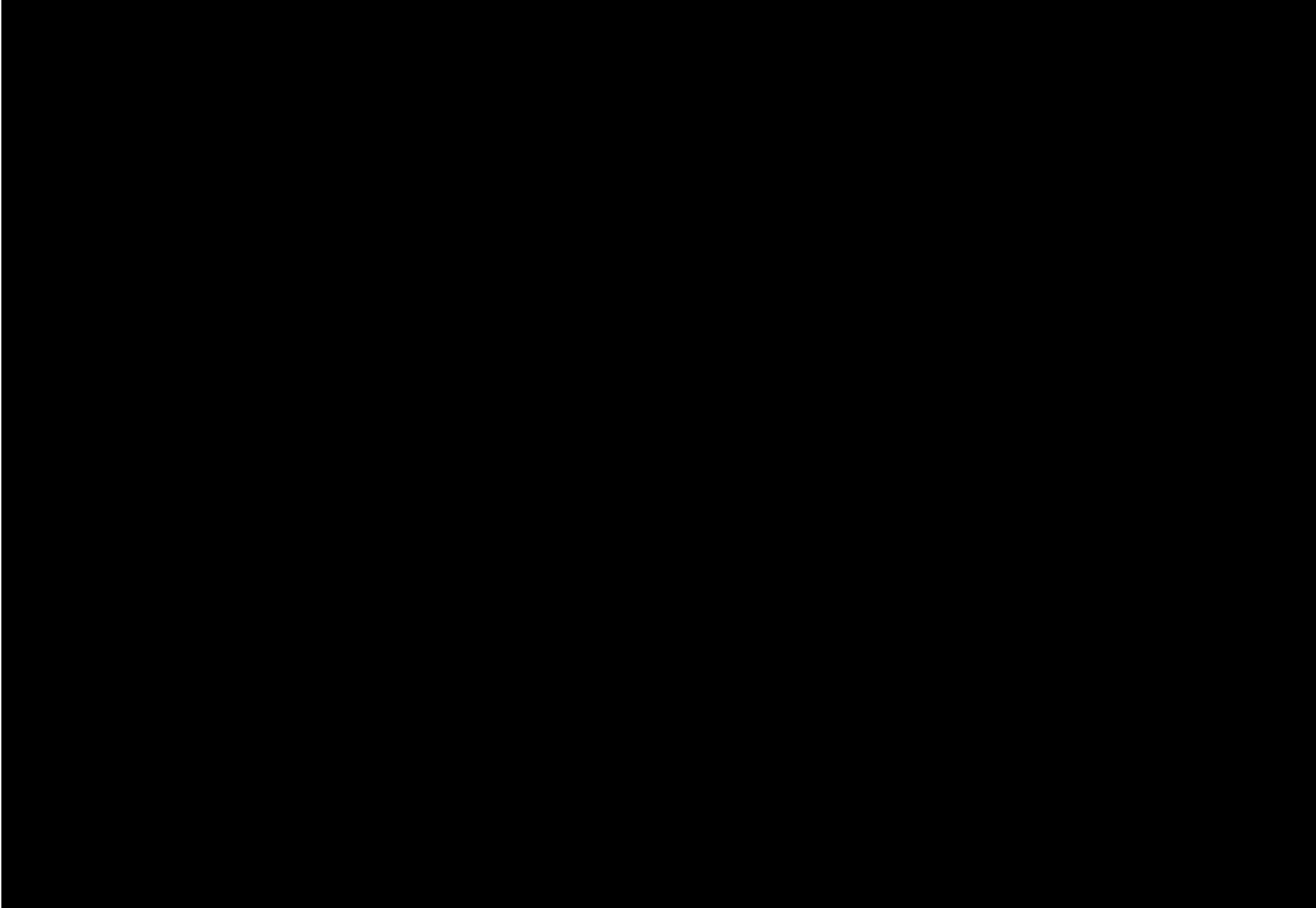


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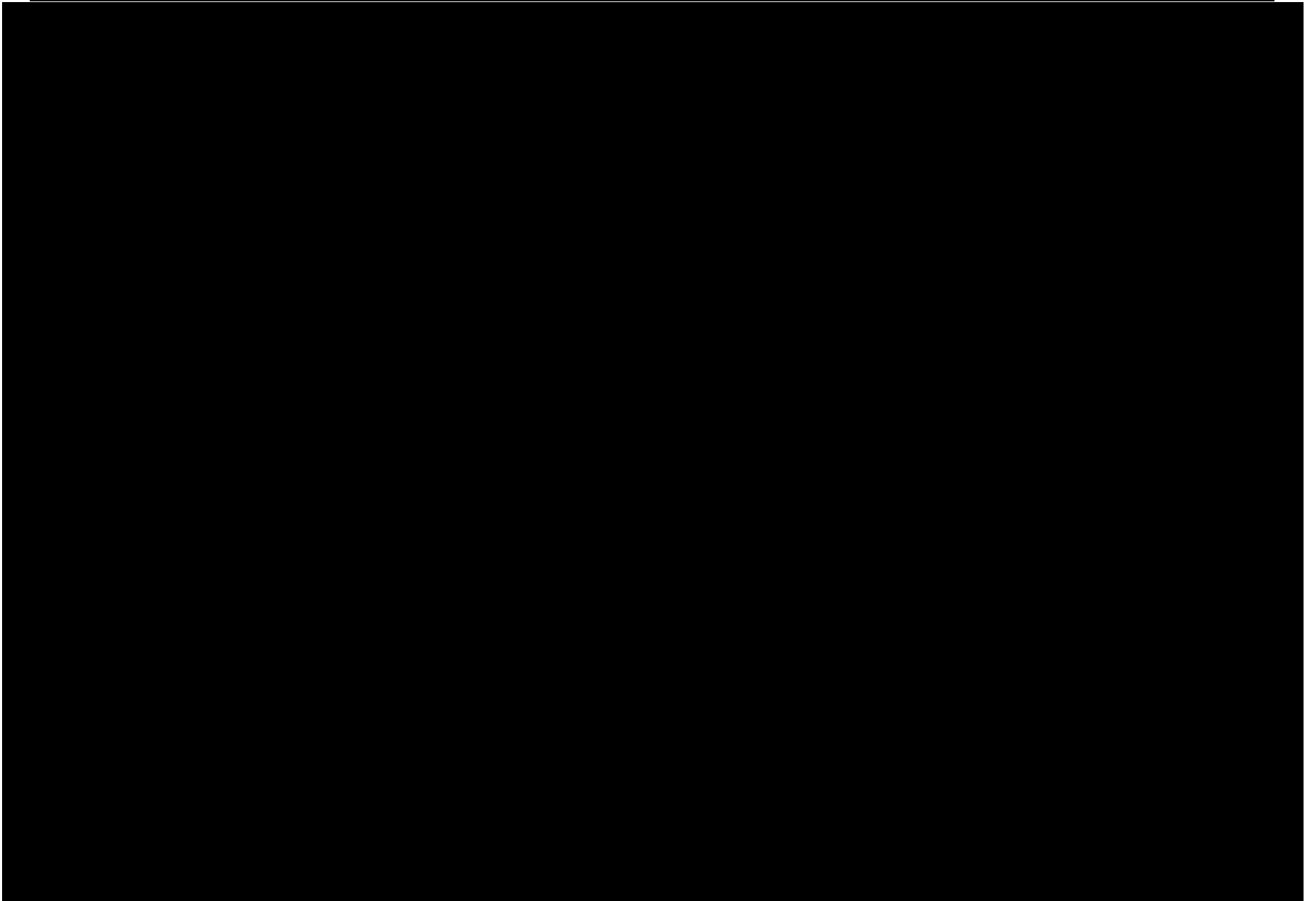


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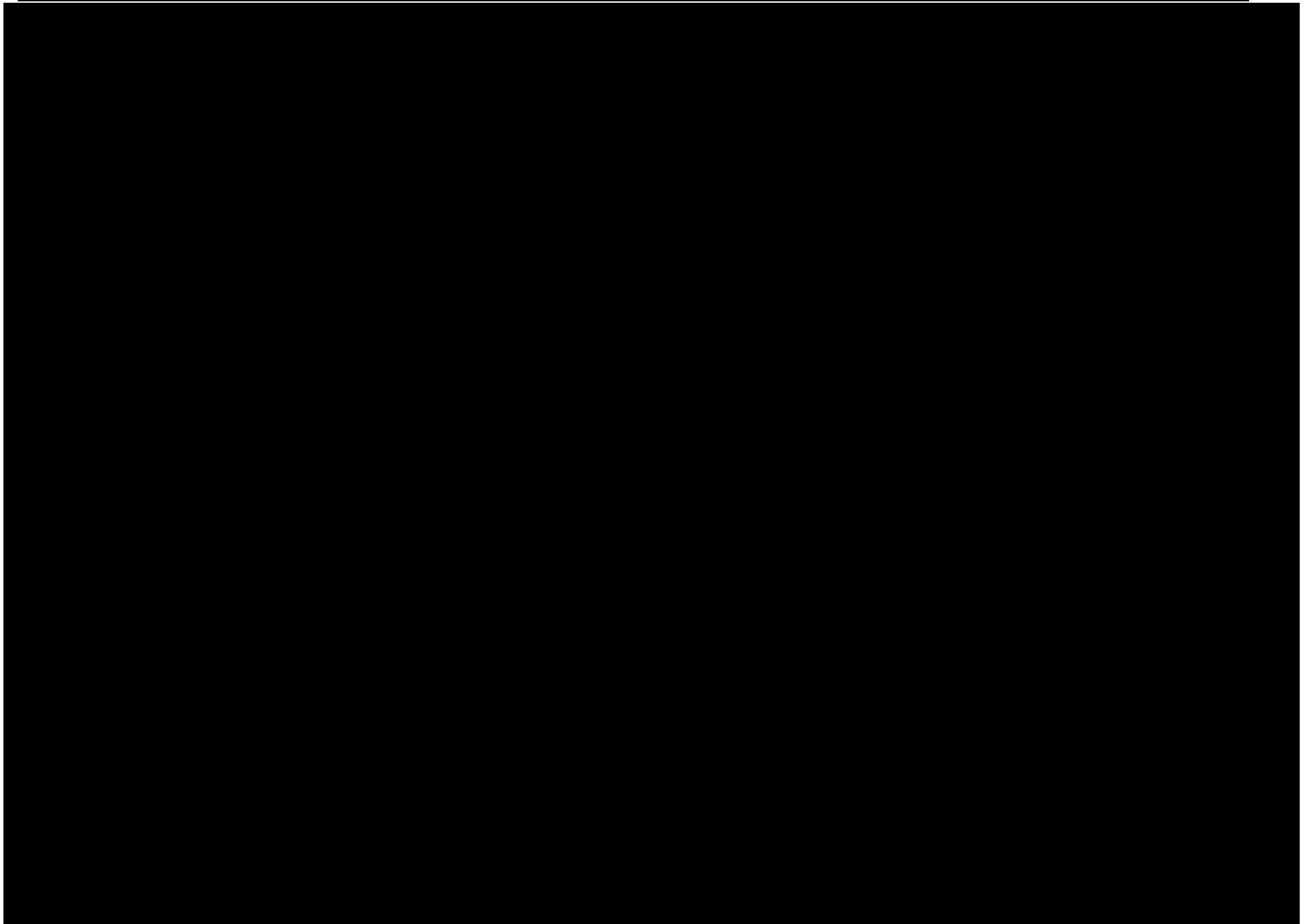


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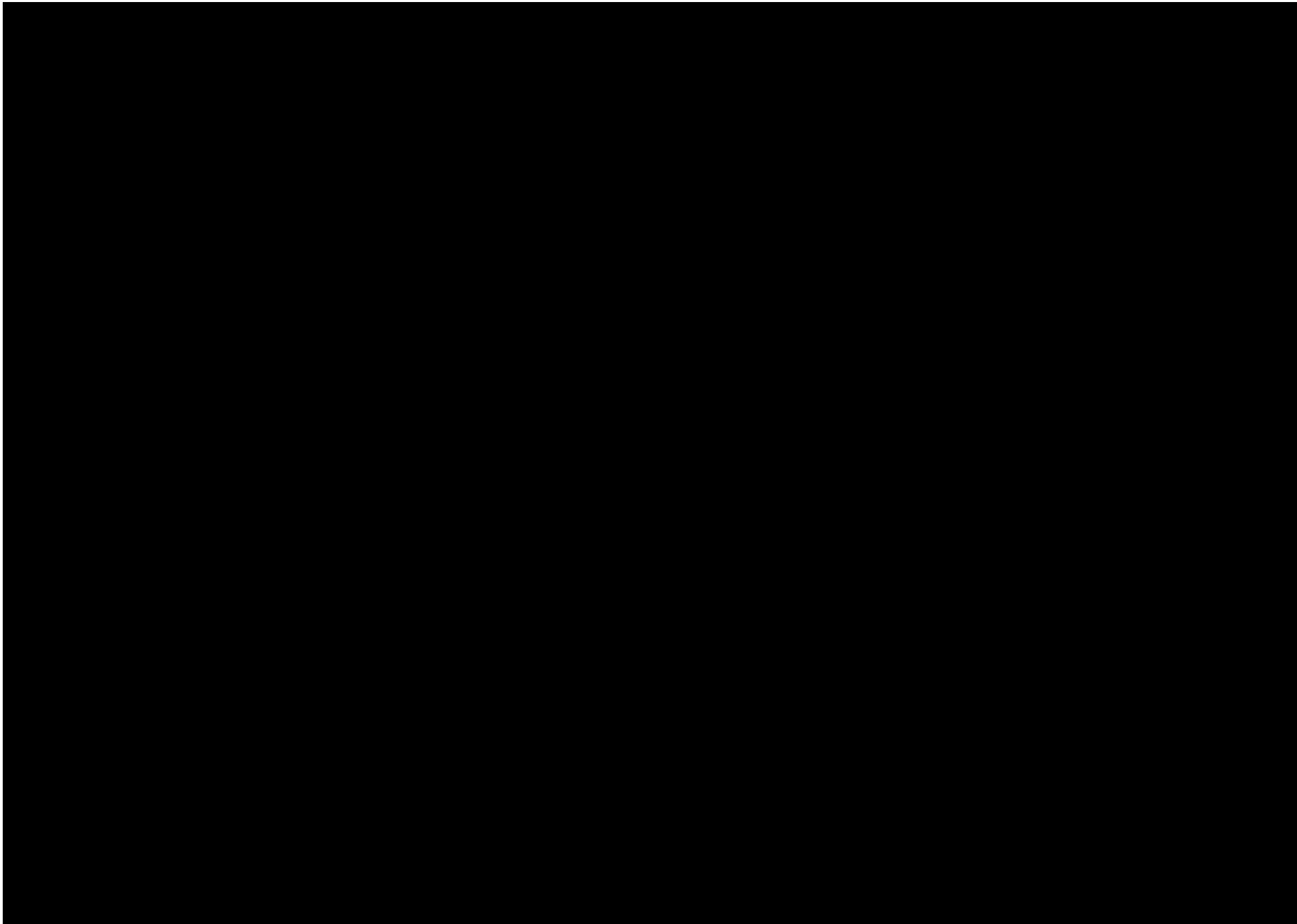


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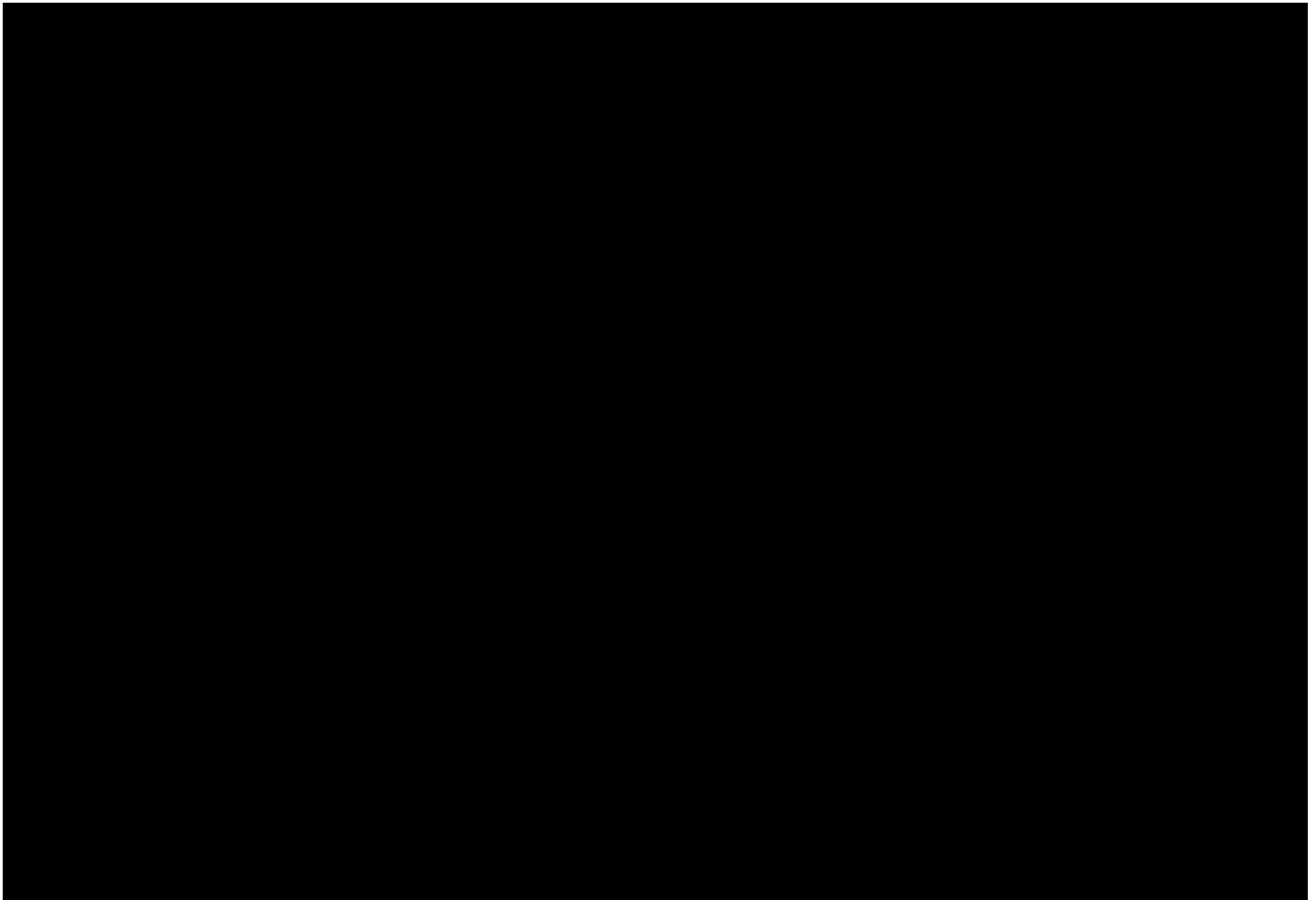


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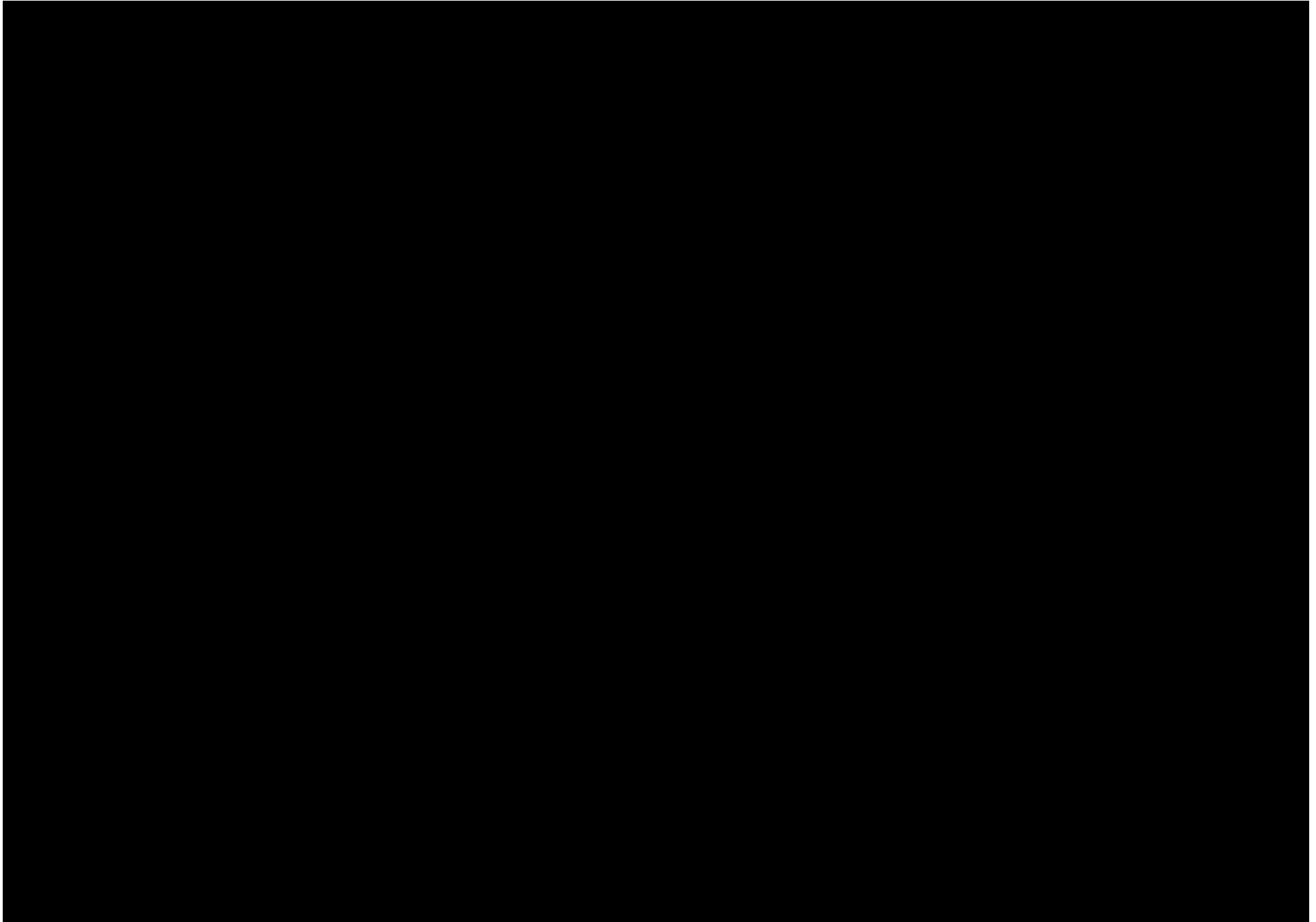


Table C.5: Historical Costs

Sources: C-1169 to C-1318, Table C.6, Table C.7

Amounts listed in C-1172, a duplicative file, are excluded.

Notes:

[5]: Indicates Bilcon's share of payments, if provided.

[6]: Based on discussions with Respondent's counsel, I included as evidence of payments items such

[7]: If the document [redacted] s, 'Yes' is reported, otherwise 'No'.

[8]: If the document reports monetary amounts in U.S. dollars, 'Yes' is reported, otherwise 'No'.

[9]: The month-end exchange rate of C\$ per US\$, as reported by Bloomberg, using the date reported in [3]. See Table C.7.

[10]: If [4] is reported in C\$, as indicated in [8], then [4] is reported. Otherwise, [4] x [9].

[11]: If [4] is reported in US\$, as indicated in [8], then [4] is reported. Otherwise, [4] / [9].

[12]: [10] x [5].

[13]: [11] x [5].

[14]: If support for the line item is present, as indicated in [6], and the check is not written by Ralph Clayton & Sons, as indicated in [7], then [12], otherwise, 0.

Table C.6: Index Between Historical Cost Line Items and Cost Categories

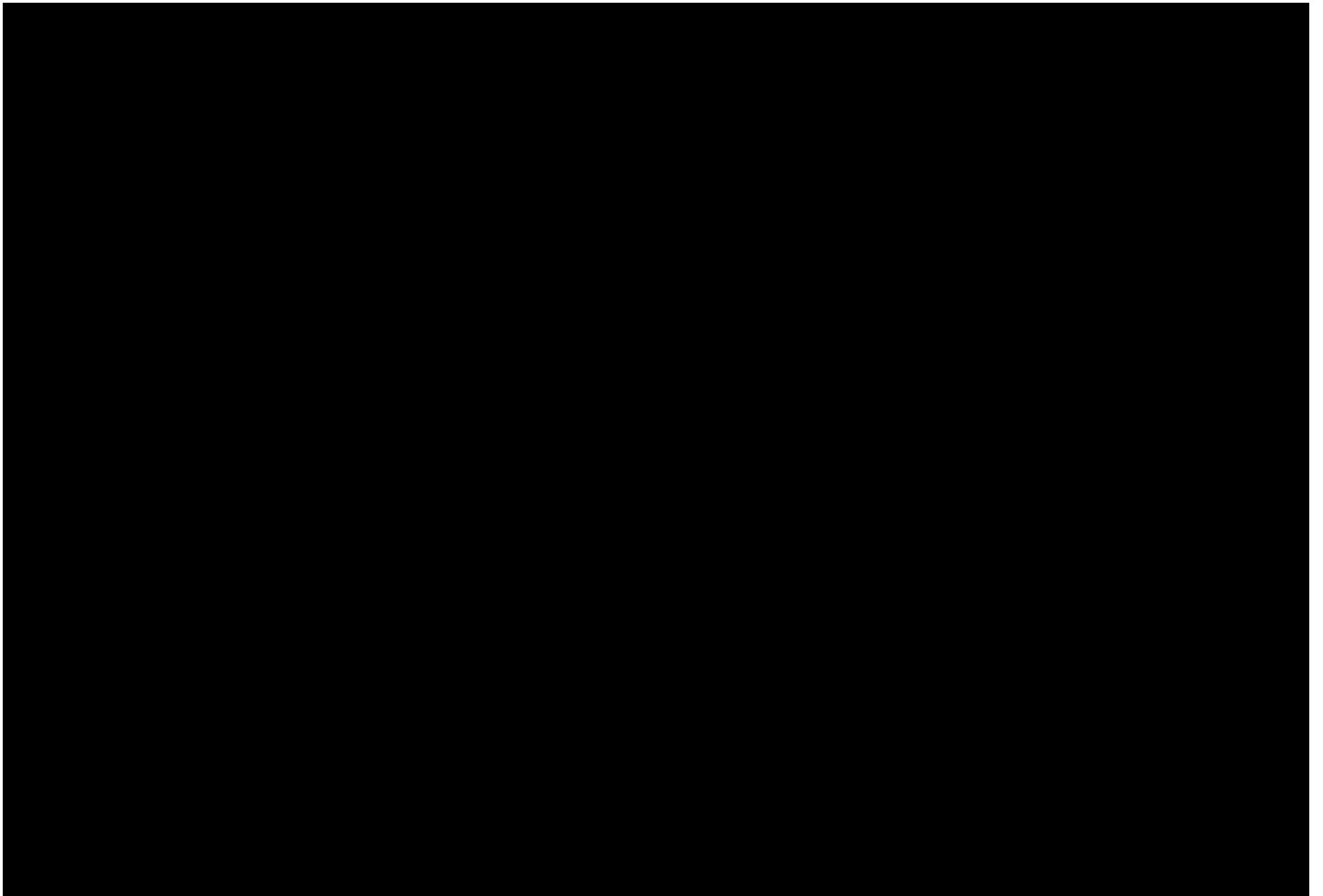


Table C.6: Index Between Historical Cost Line Items and Cost Categories

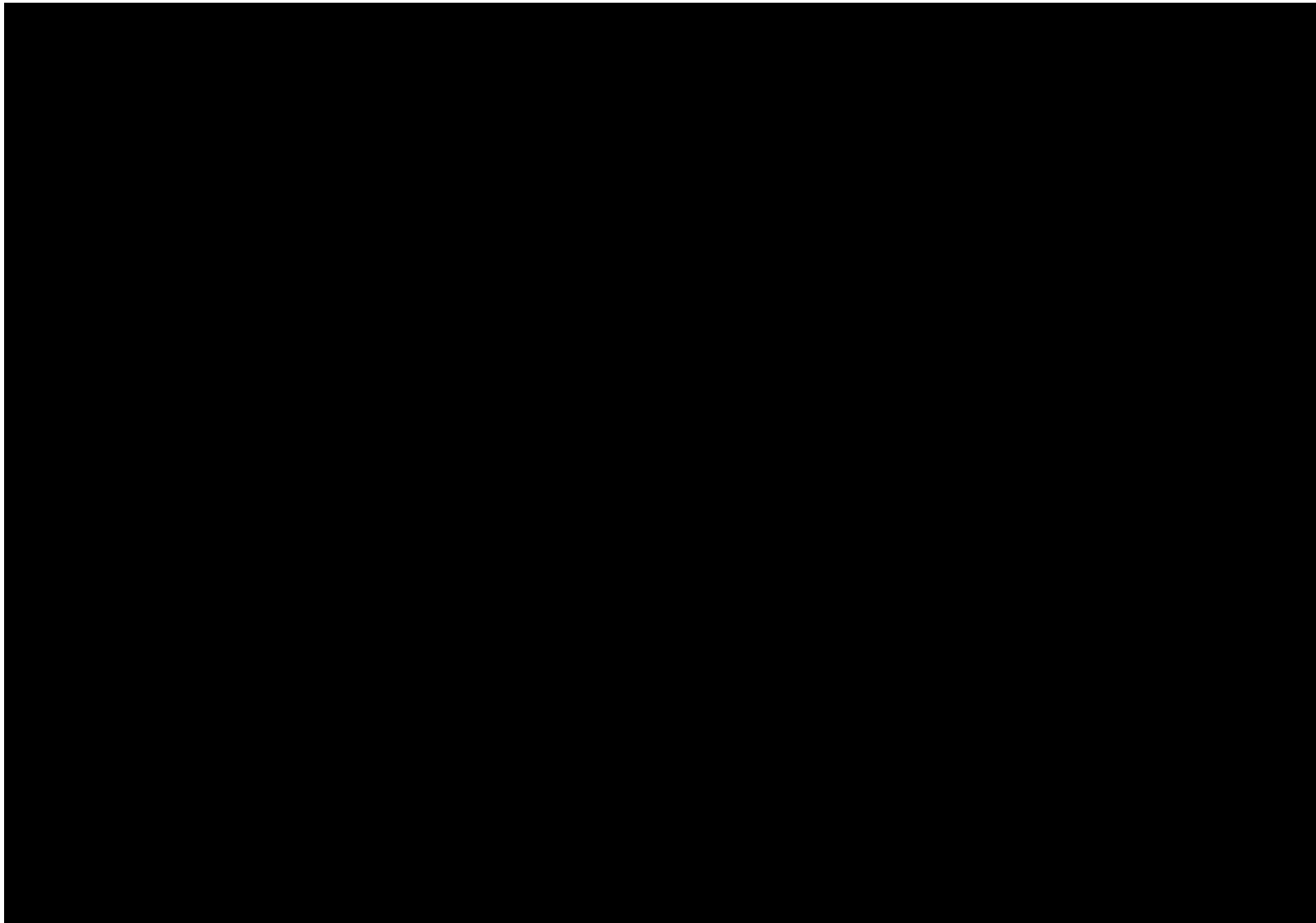


Table C.6: Index Between Historical Cost Line Items and Cost Categories

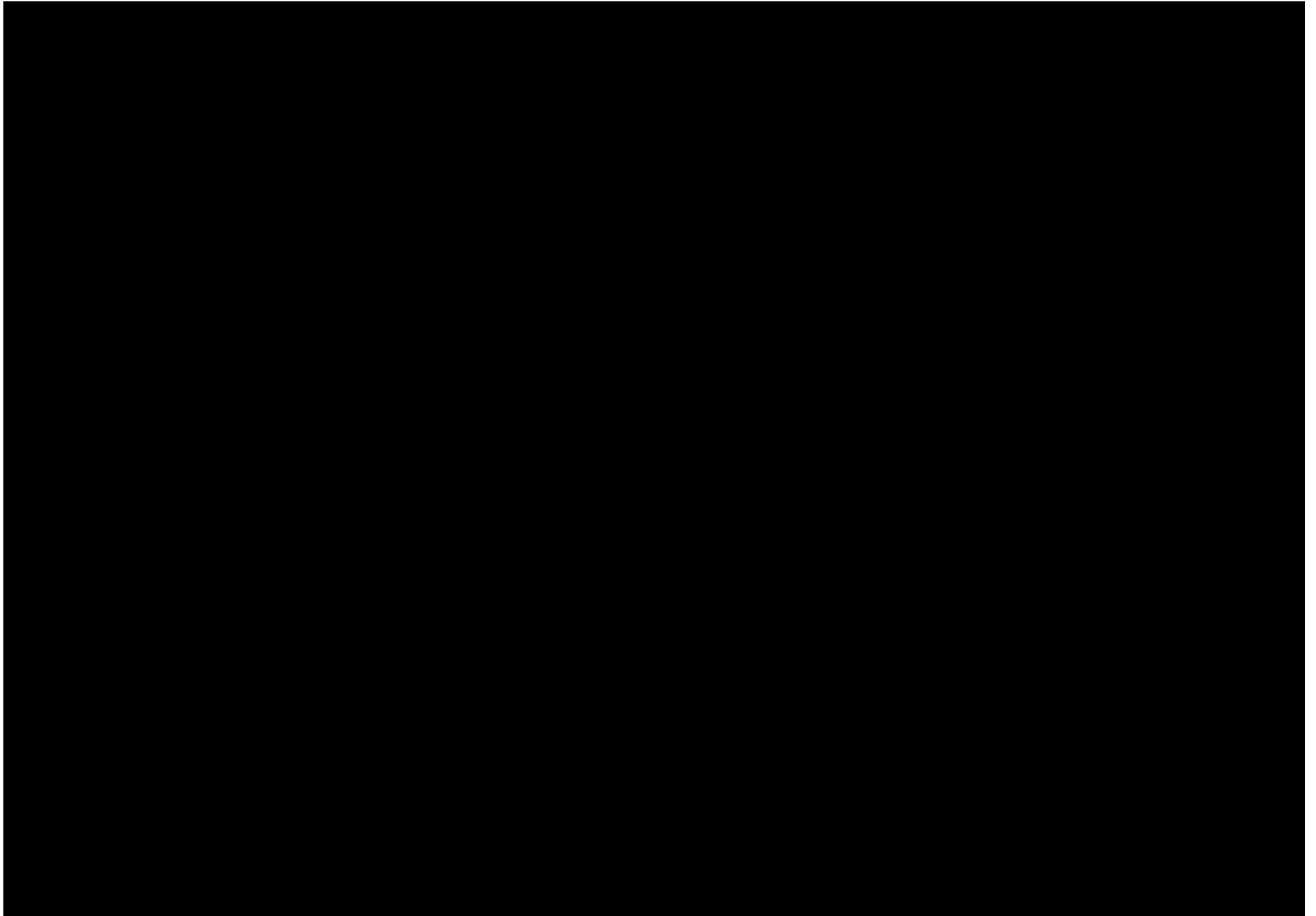


Table C.6: Index Between Historical Cost Line Items and Cost Categories

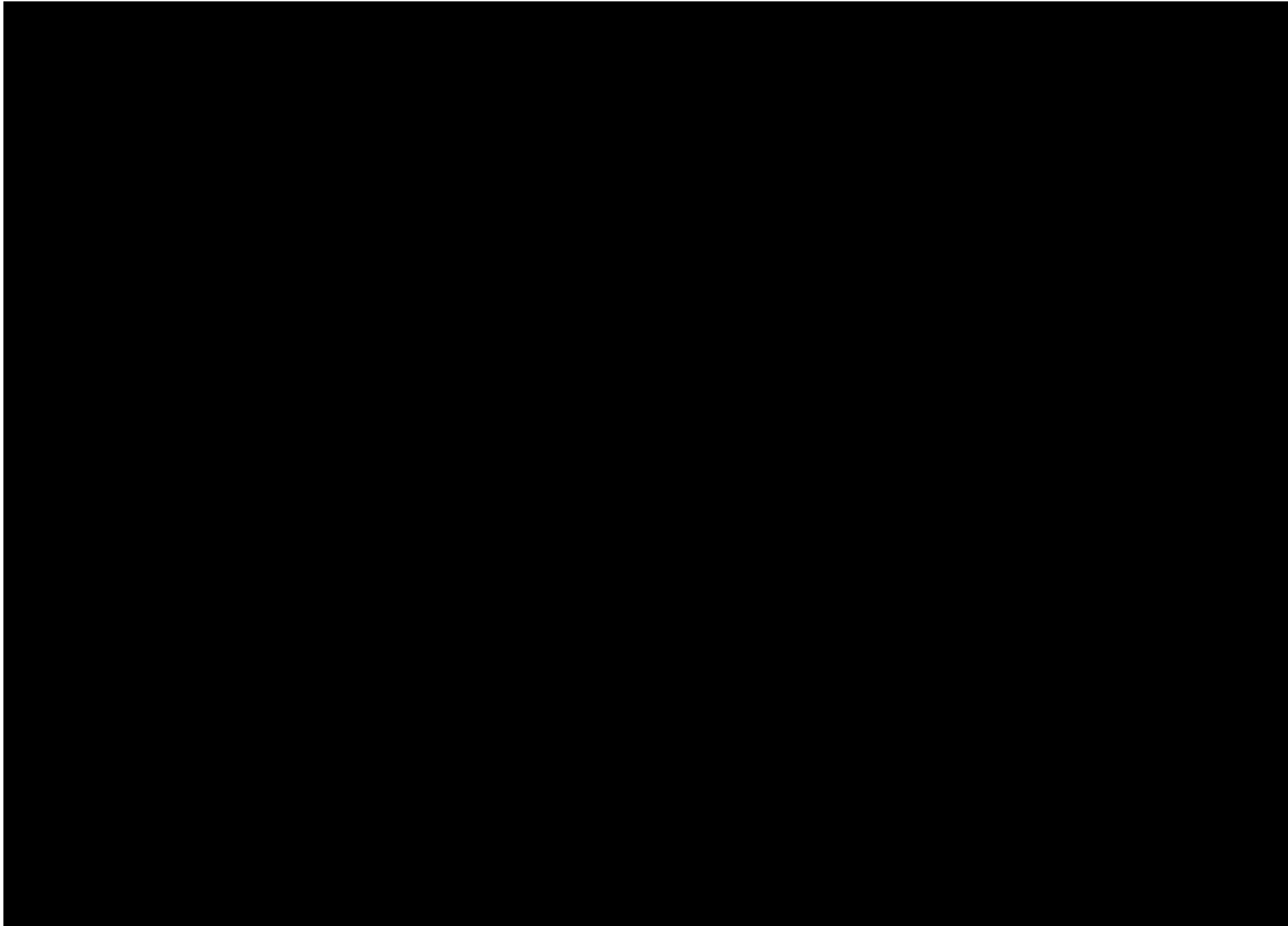


Table C.6: Index Between Historical Cost Line Items and Cost Categories

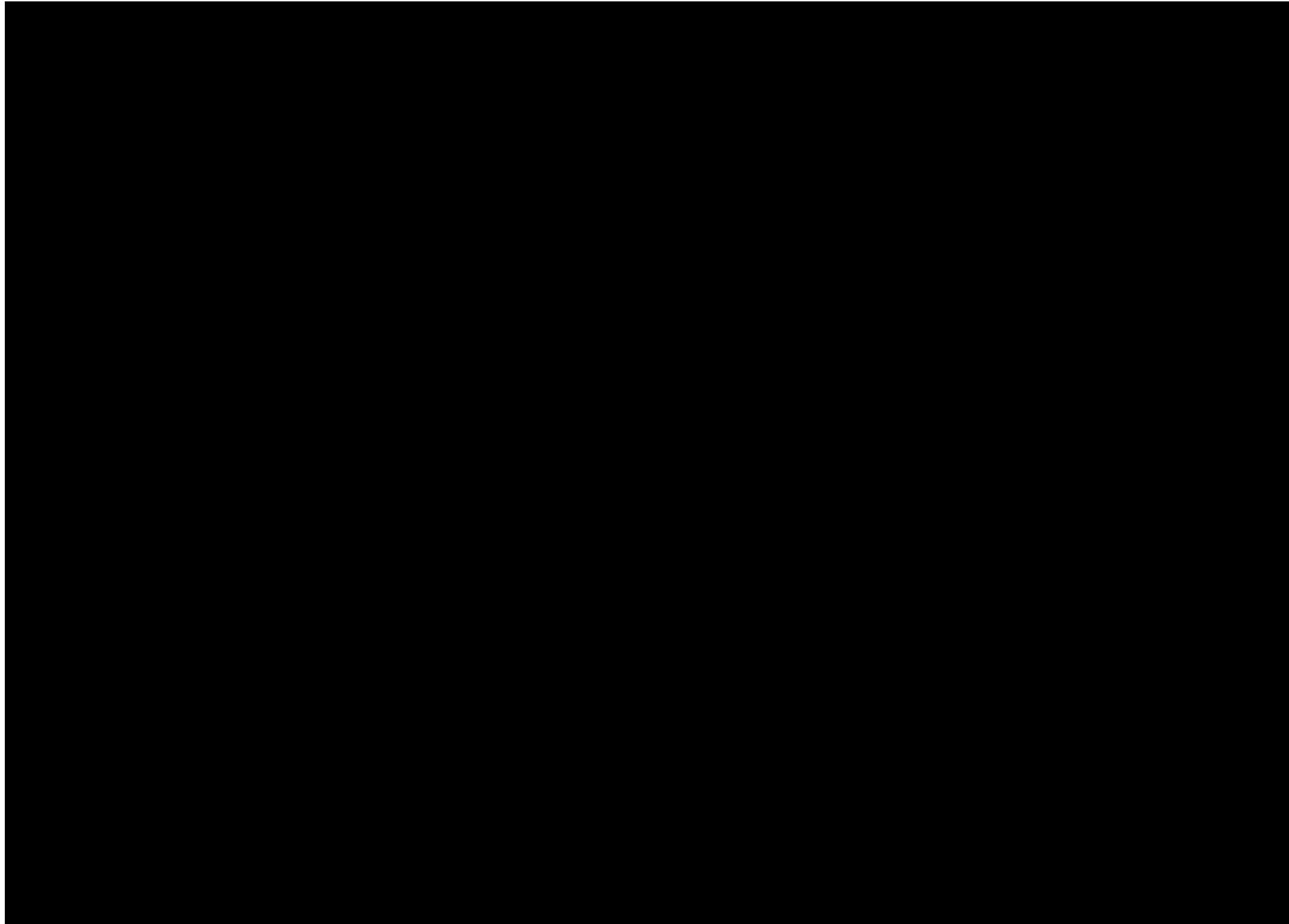


Table C.6: Index Between Historical Cost Line Items and Cost Categories

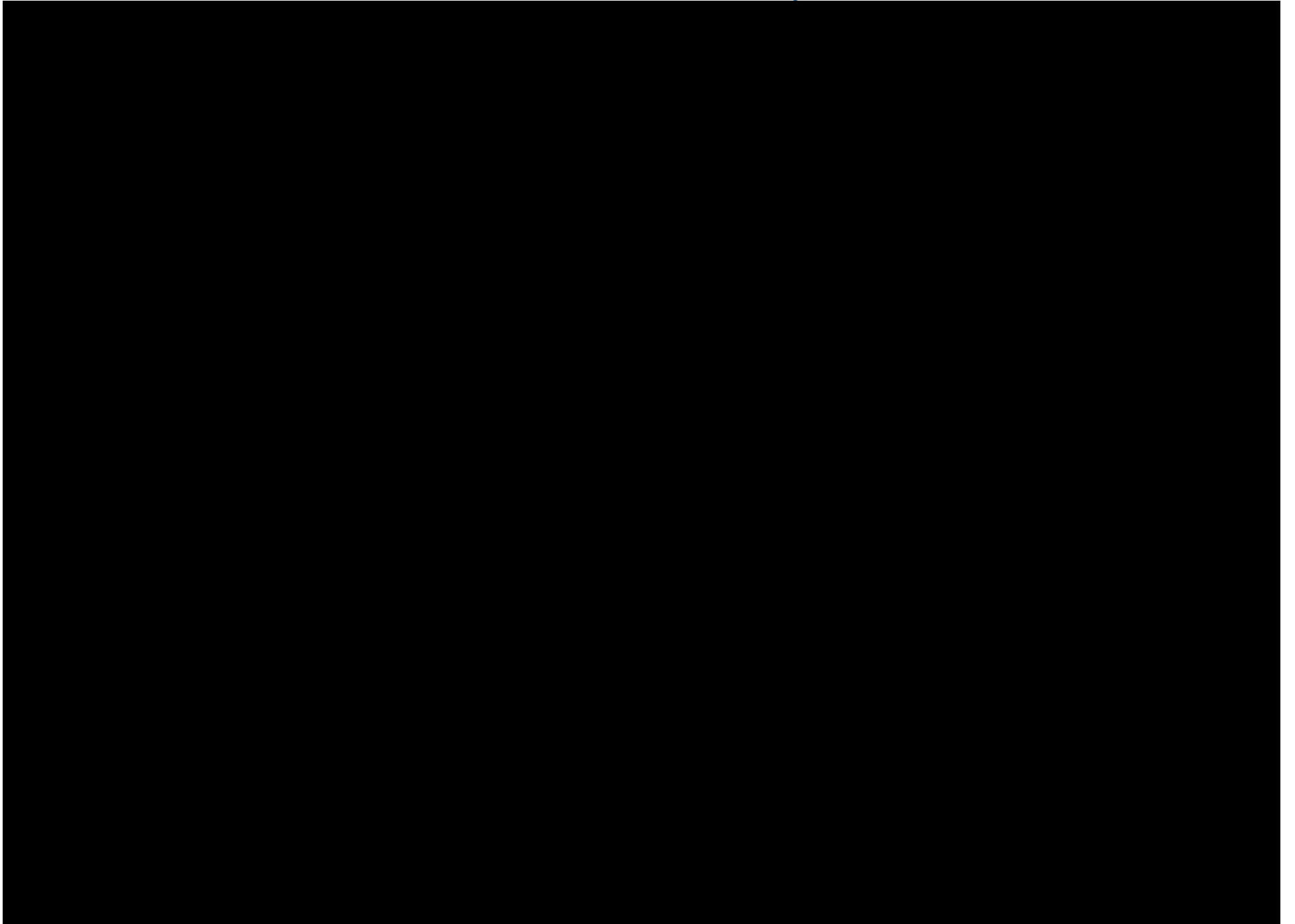


Table C.6: Index Between Historical Cost Line Items and Cost Categories

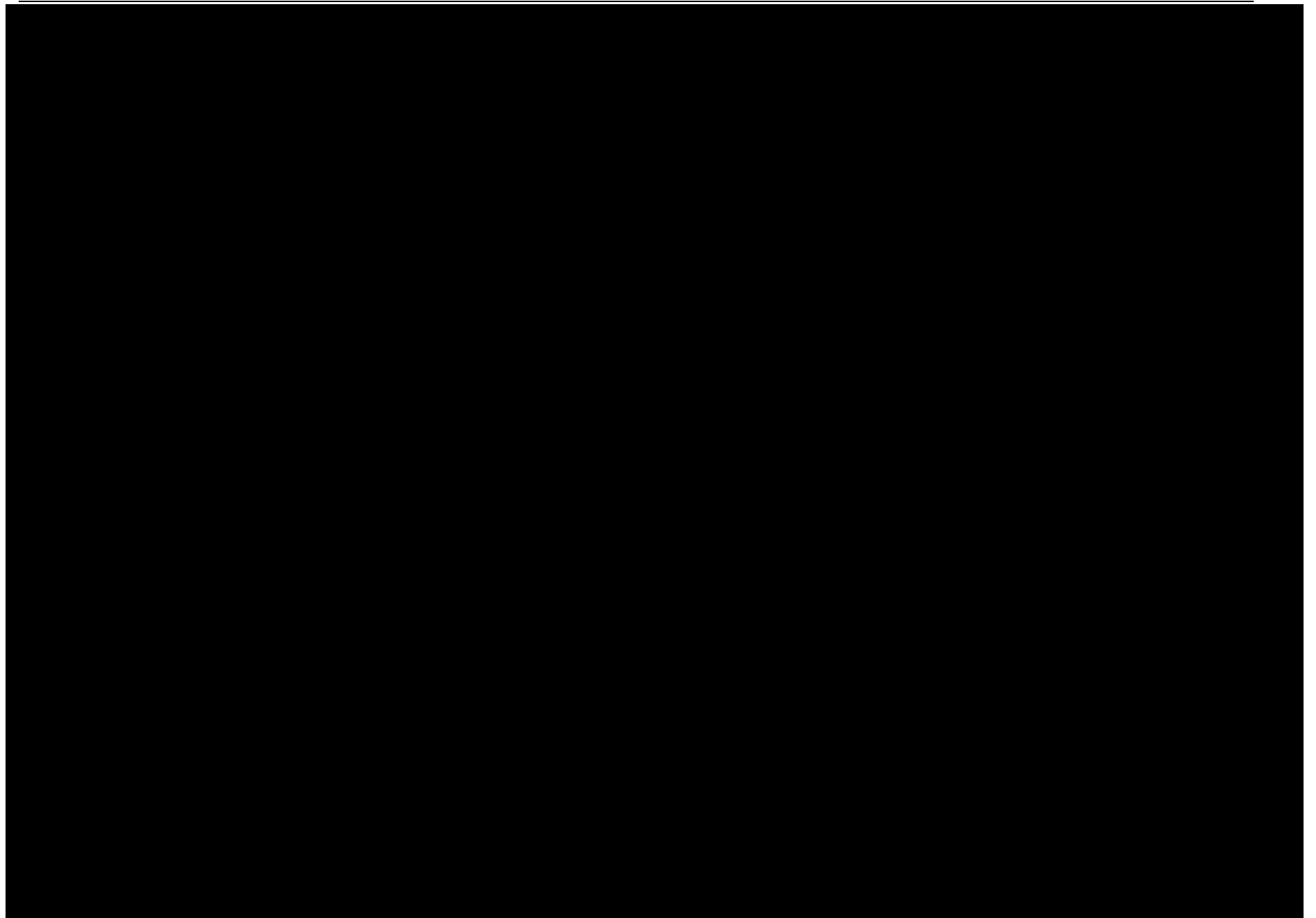


Table C.6: Index Between Historical Cost Line Items and Cost Categories

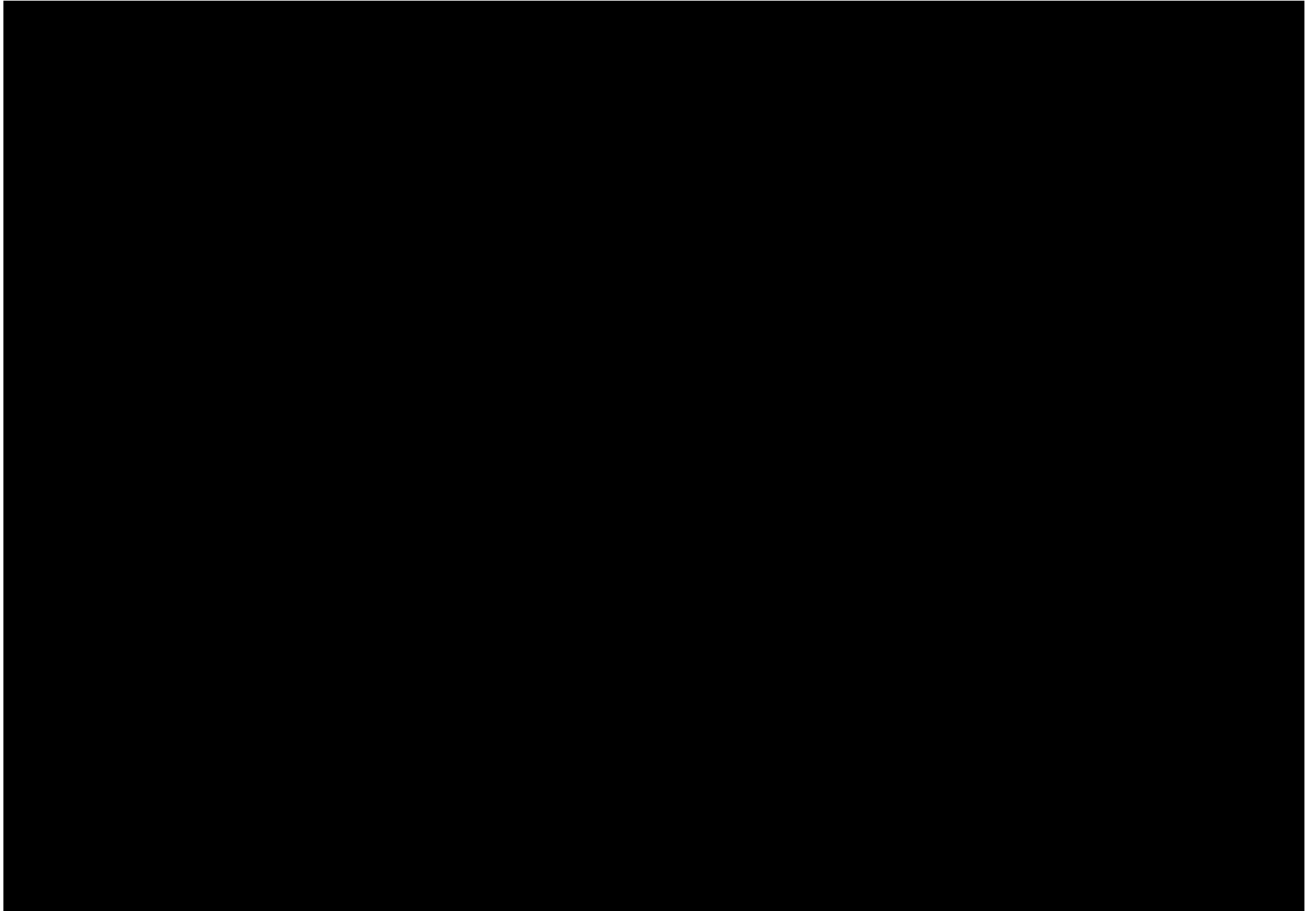


Table C.6: Index Between Historical Cost Line Items and Cost Categories

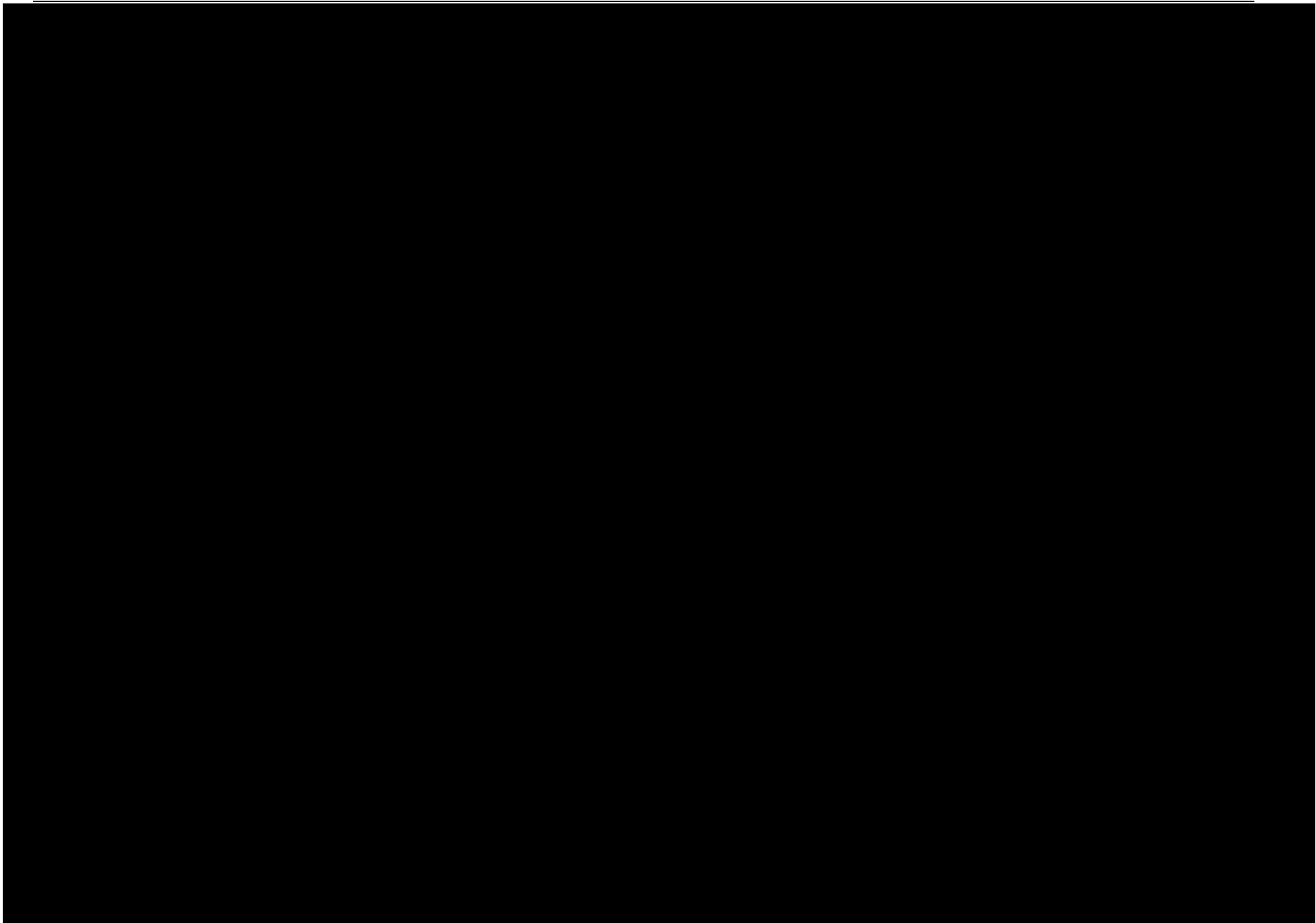


Table C.6: Index Between Historical Cost Line Items and Cost Categories

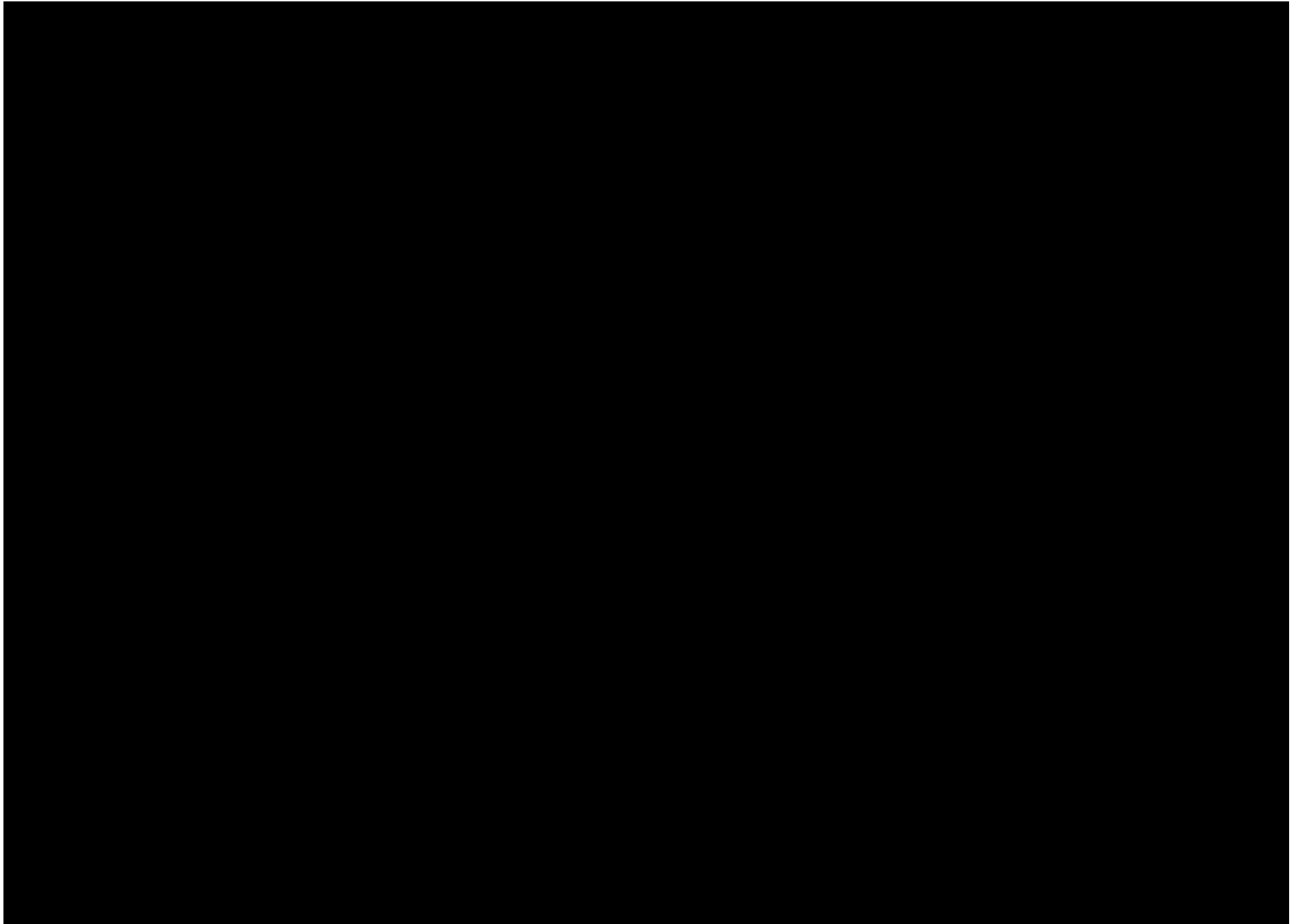


Table C.6: Index Between Historical Cost Line Items and Cost Categories

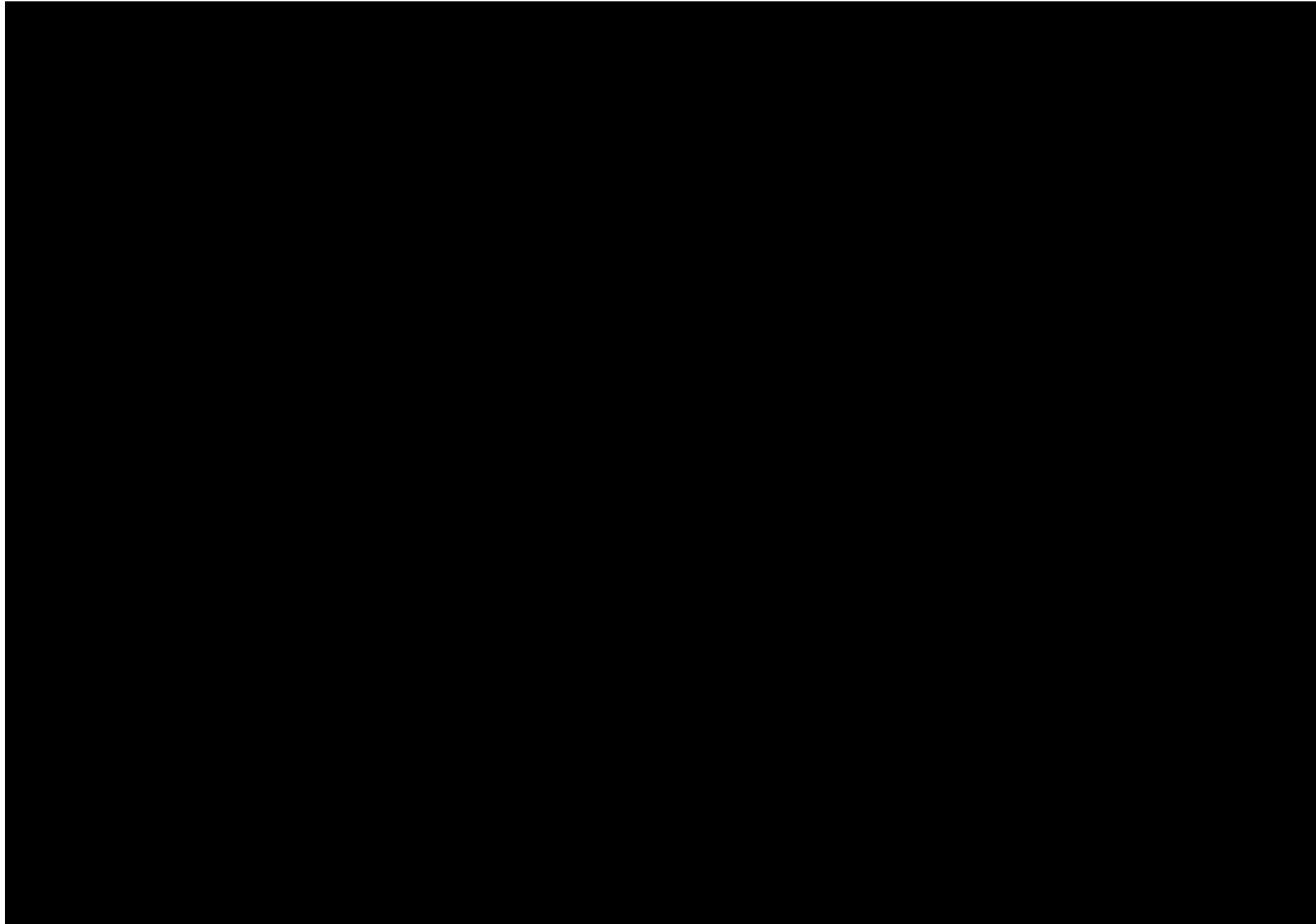


Table C.6: Index Between Historical Cost Line Items and Cost Categories

Source: C-1169 to C-1318.

Notes:

Counsel has instructed on the categorization of invoices into Consulting Experts, Panel Costs, Office & Operations, Non-EA Related Quarry Costs, and Withholding Tax (CCRA)

[1]: Entity paid by Bilcon, as listed in the source document

[2]: Entity paid by Bilcon, with generalized name.

[3]: Description of [1], taken from the Claimants' Memorial, of the document provided

[4]: Cost category.

**Table C.7:
Exchange Rates
(Canadian Dollars to U.S. Dollars)**

Month	Exchange Rate
May-02	1.5279
Jun-02	1.5174
Jul-02	1.5842
Aug-02	1.5585
Sep-02	1.5868
Oct-02	1.5584
Nov-02	1.5653
Dec-02	1.5718
Jan-03	1.5195
Feb-03	1.4846
Mar-03	1.4673
Apr-03	1.4301
May-03	1.3666
Jun-03	1.3467
Jul-03	1.4043
Aug-03	1.3865
Sep-03	1.3521
Oct-03	1.3198
Nov-03	1.3008
Dec-03	1.2970
Jan-04	1.3252
Feb-04	1.3343
Mar-04	1.3093
Apr-04	1.3722
May-04	1.3624
Jun-04	1.3328
Jul-04	1.3314
Aug-04	1.3127
Sep-04	1.2613
Oct-04	1.2177
Nov-04	1.1874
Dec-04	1.2019
Jan-05	1.2398
Feb-05	1.2339
Mar-05	1.2104
Apr-05	1.2583
May-05	1.2549
Jun-05	1.2251
Jul-05	1.2233
Aug-05	1.1878
Sep-05	1.1630

Table C.7:
Exchange Rates
(Canadian Dollars to U.S. Dollars)

Month	Exchange Rate
Oct-05	1.1822
Nov-05	1.1657
Dec-05	1.1620
Jan-06	1.1390
Feb-06	1.1369
Mar-06	1.1686
Apr-06	1.1170
May-06	1.1016
Jun-06	1.1170
Jul-06	1.1313
Aug-06	1.1037
Sep-06	1.1180
Oct-06	1.1222
Nov-06	1.1403
Dec-06	1.1657
Jan-07	1.1769
Feb-07	1.1699
Mar-07	1.1540
Apr-07	1.1097
May-07	1.0689
Jun-07	1.0653
Jul-07	1.0665
Aug-07	1.0556
Sep-07	0.9923
Oct-07	0.9431
Nov-07	0.9987
Dec-07	0.9984
Jan-08	1.0028
Feb-08	0.9878
Mar-08	1.0253
Apr-08	1.0079
May-08	0.9934
Jun-08	1.0215
Jul-08	1.0246
Aug-08	1.0637
Sep-08	1.0644
Oct-08	1.2125
Nov-08	1.2398
Dec-08	1.2188

Source: R-740, Daily PX_LAST of CAD BGN Currency

Appendix D: Discounted Cash Flow Analysis of Potential Profits

Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)

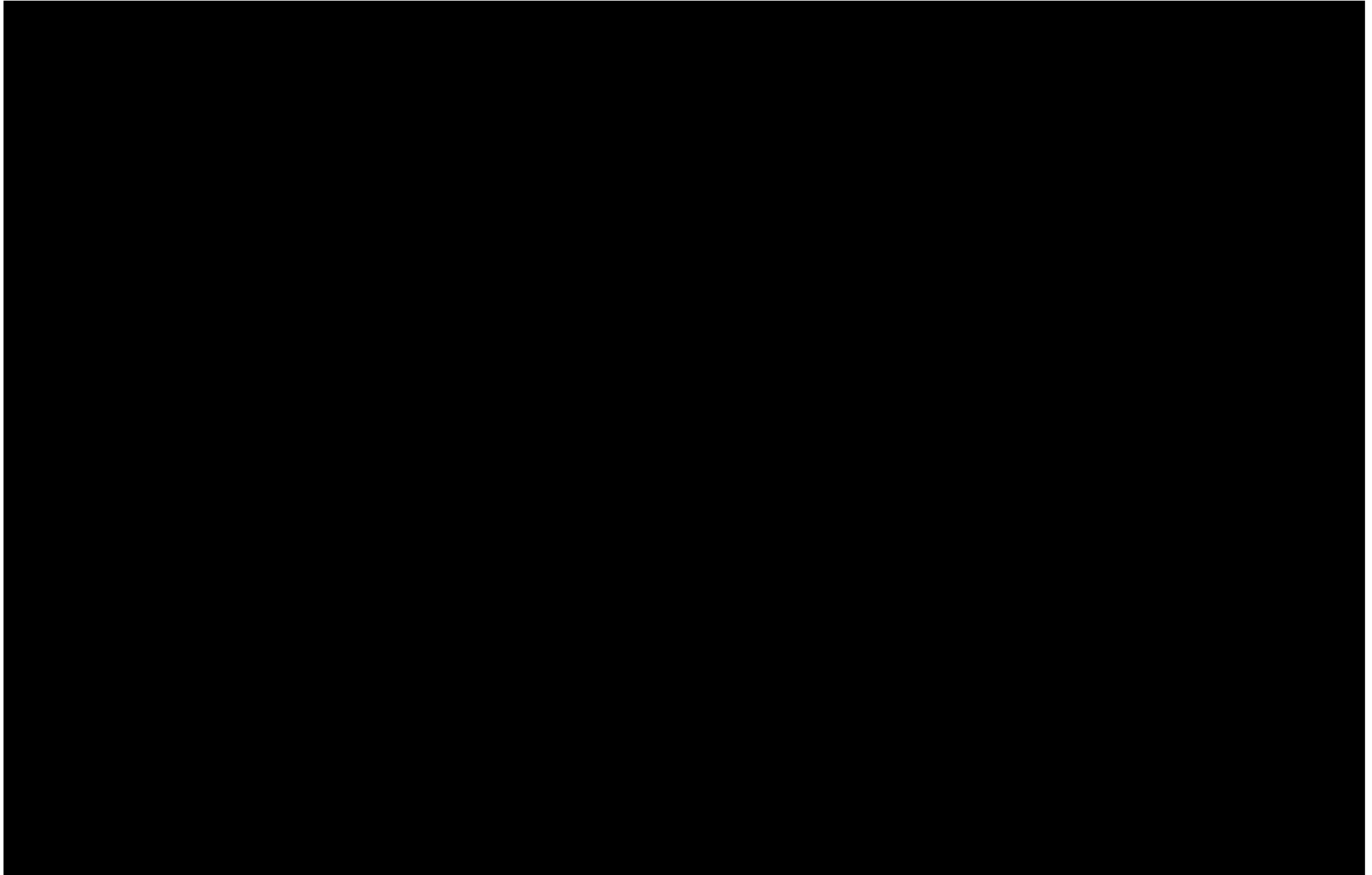


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)

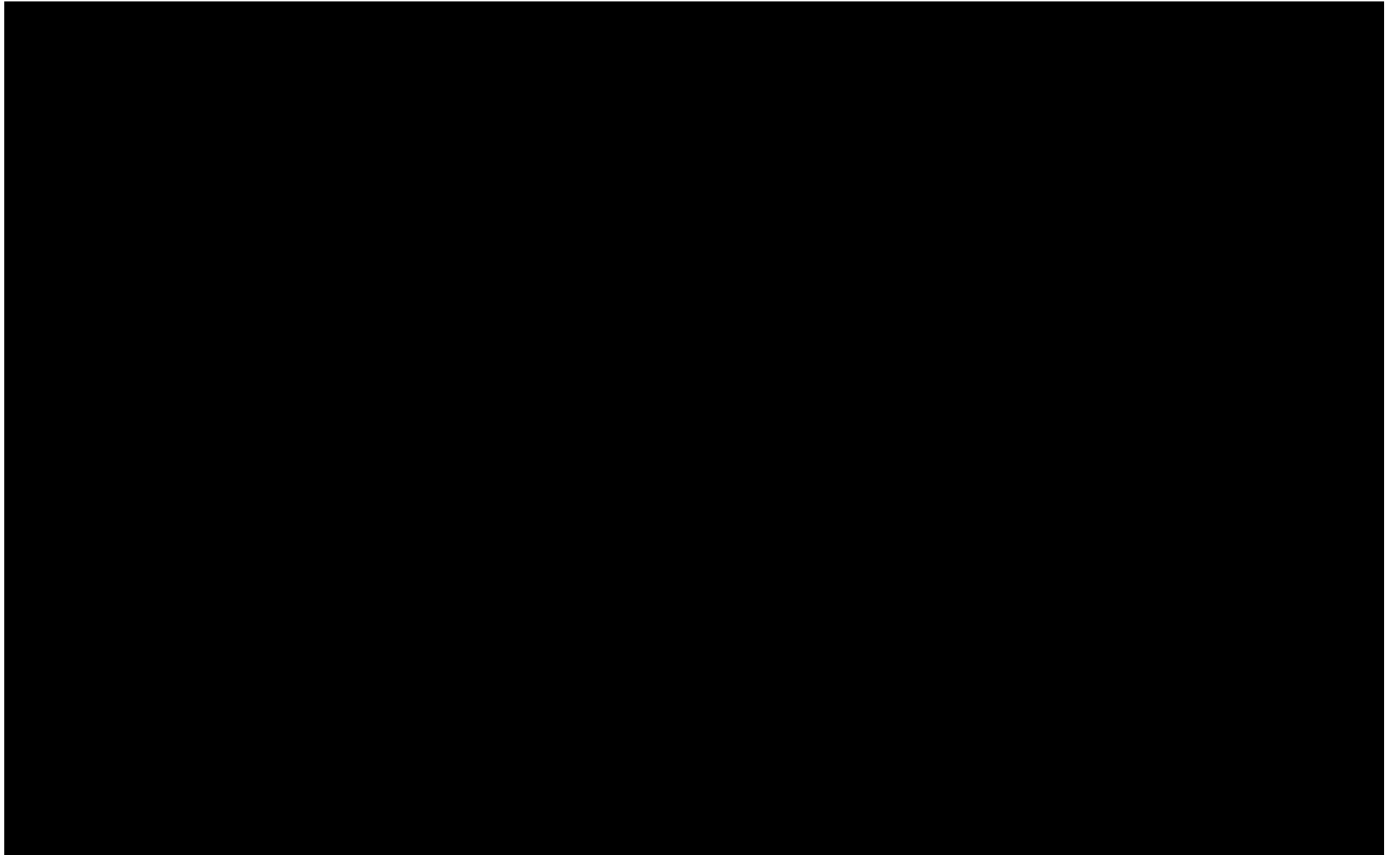


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)

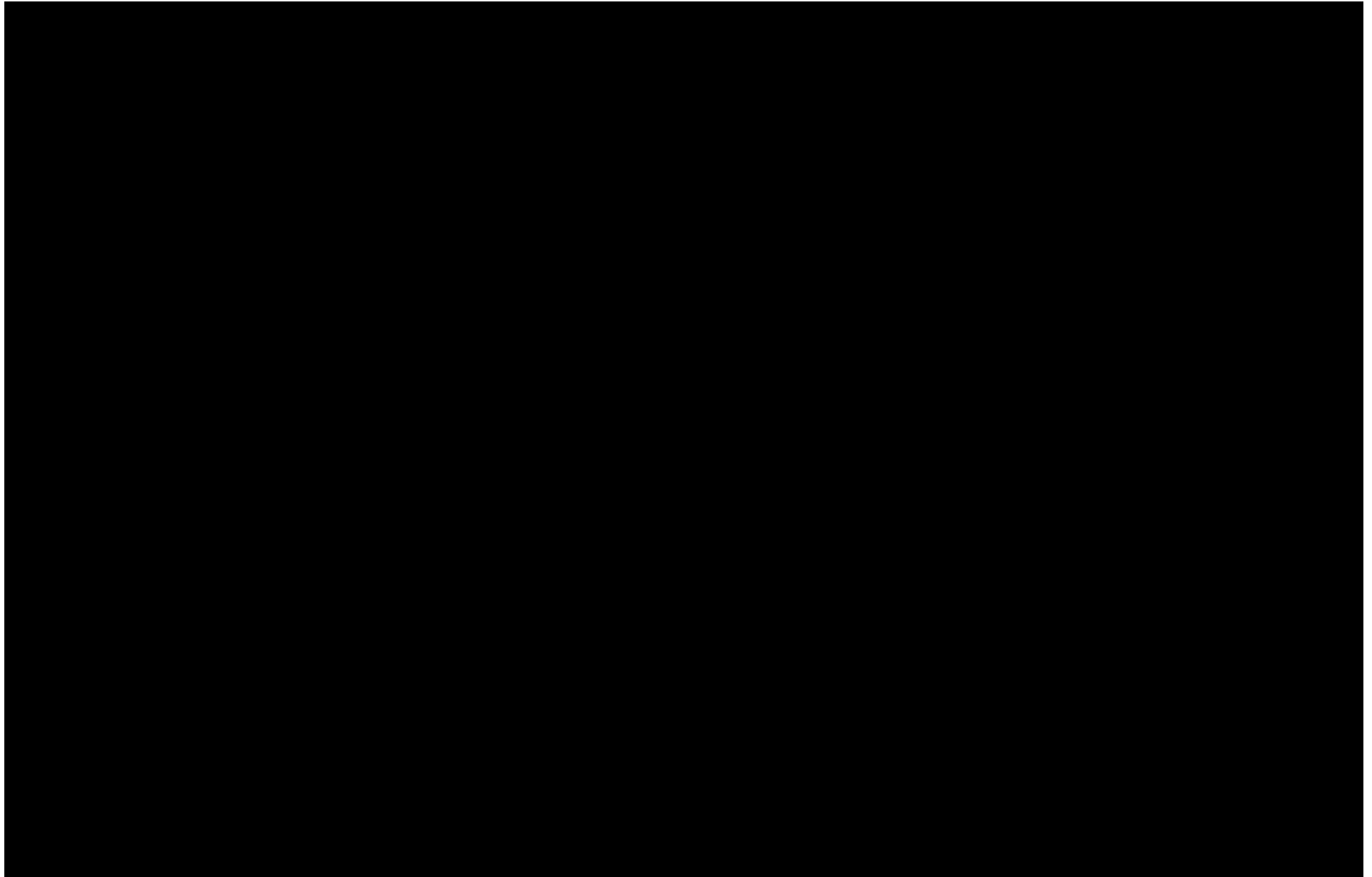


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)

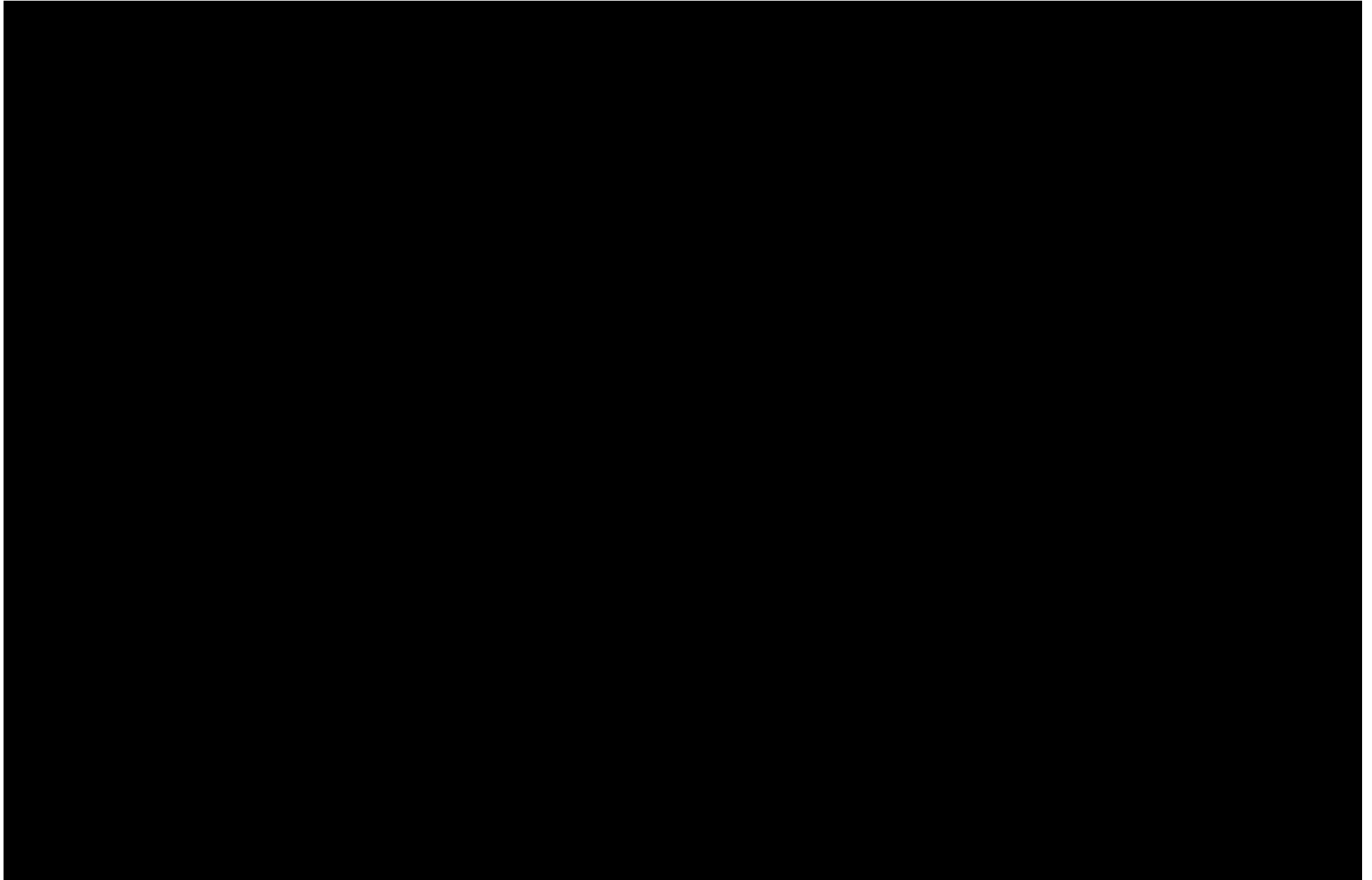


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)

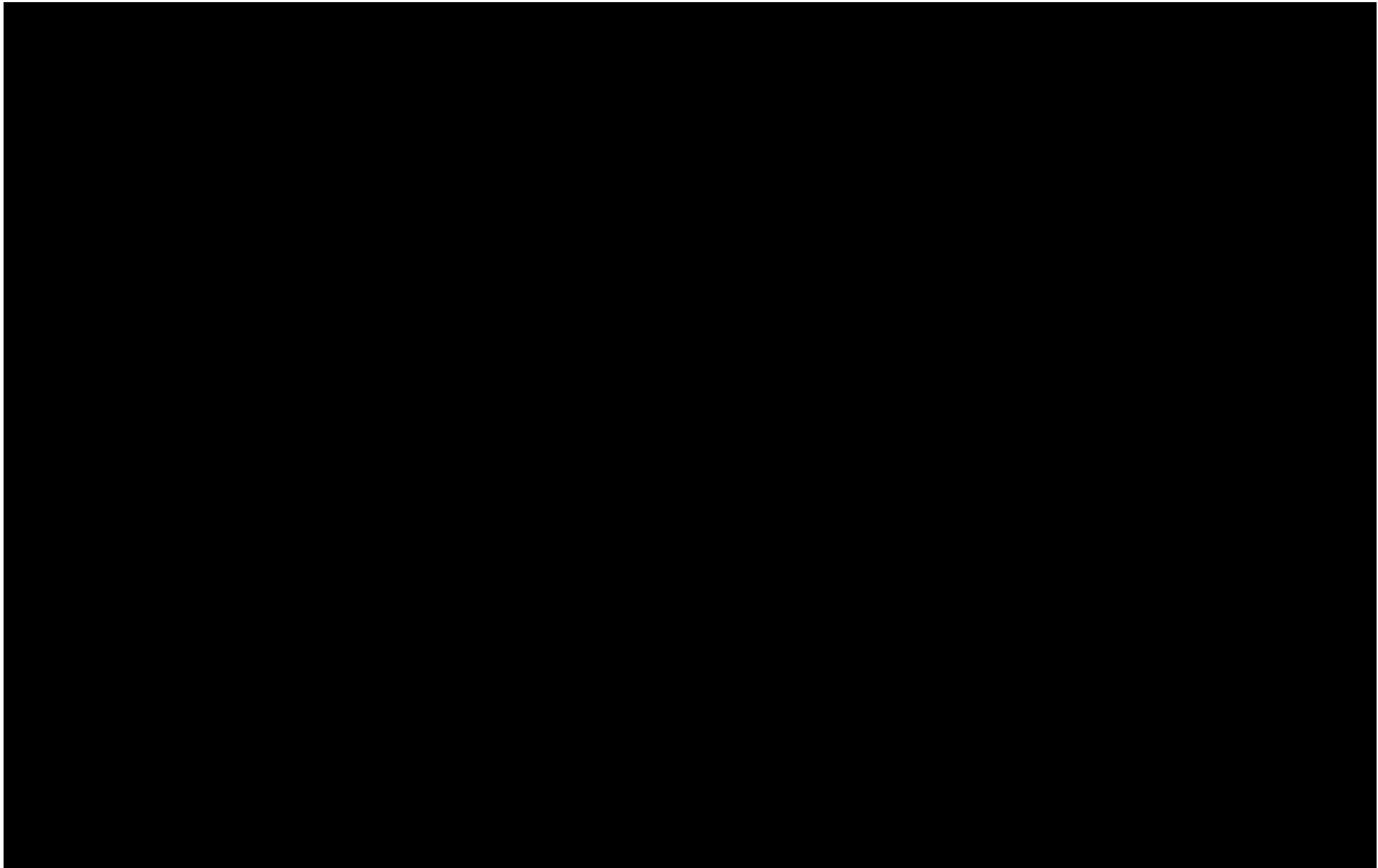
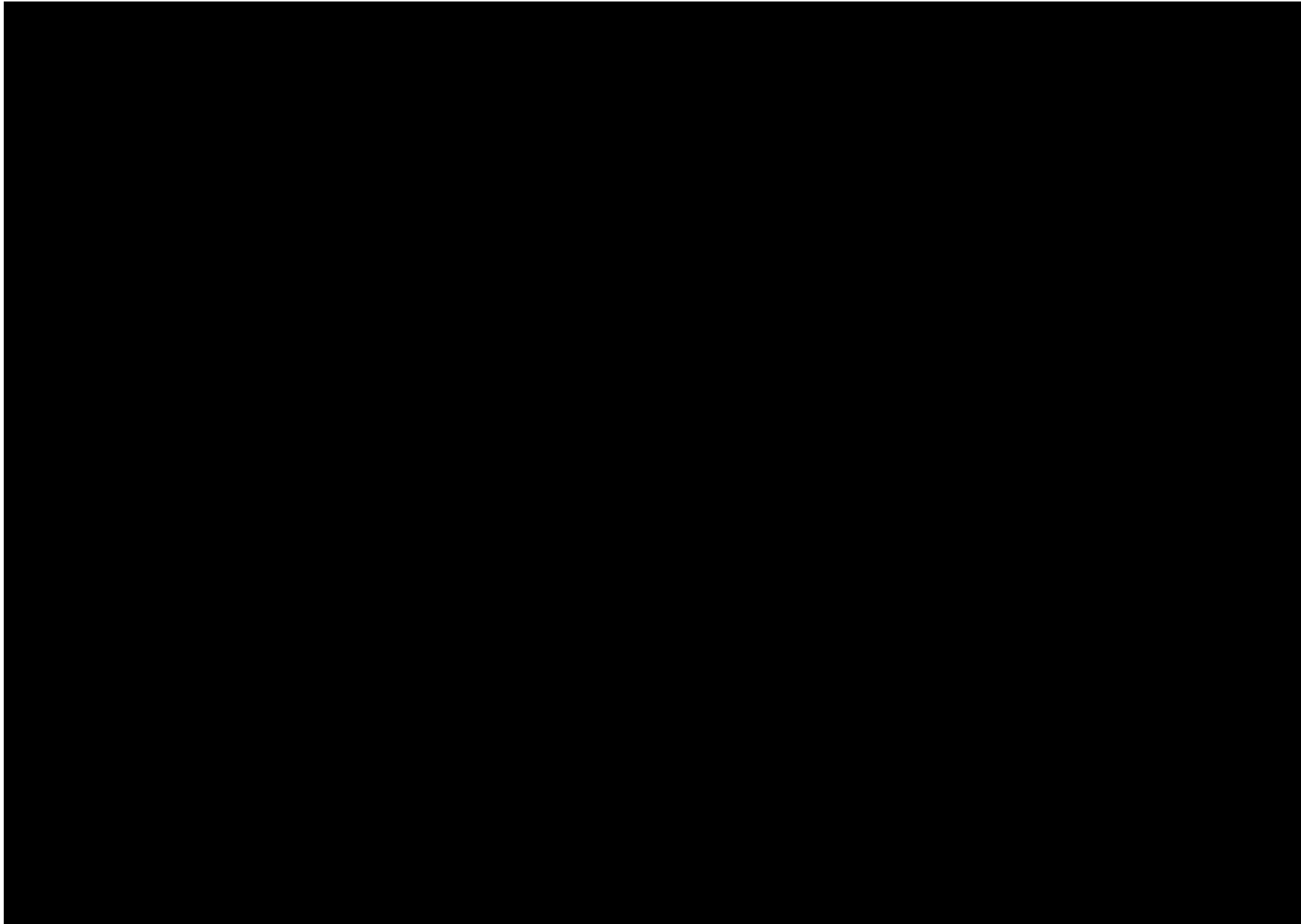


Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)



**Table D.1: Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)**

Sources & Notes:

[1]: Chodorow Report I, Section V.D.

[2]: See Chodorow Report I, Appendix G.

[3]: D.2.

[4]: D.2.

[5]: D.3.

[6]: [4] x [5].

[7]: (-1) x [3] x Table D.4 [3] x Table D.4 [6] .

[8]: Chodorow Report I, Section V.F.2.

[9]: The sum of Table D.6 [9], Table D.7 [8], and
Table D.8 [4].

[10]: The sum of [6] through [9].

[11]: 5% of [6]. See Rosen Report I, Schedule 1.

[12]: D.9.

[13]: D.10.

[14]: The sum of [10] through [13].

[15]: D.11.

[16]: D.5.

[17]: D.12.

[18]: The sum of [14] through [17].

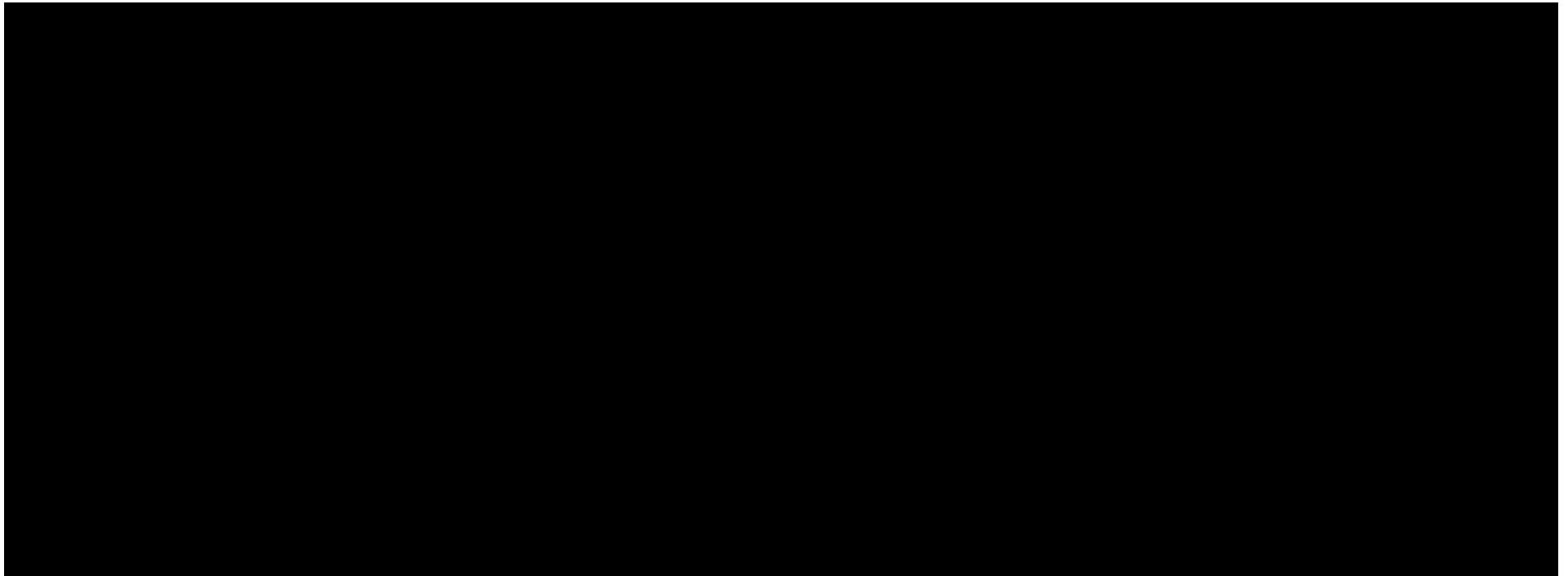
[19]: Assumed mid-year cashflows. See Rosen Report I, Schedule 1.

[20]: $1 / (1 + [2]) ^ (([19] - [1]) / 365)$.

[21]: [18] x [20].

[22]: The sum of [21].

**Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI.B.

[2]: Chodorow Report I, Section VI.B.

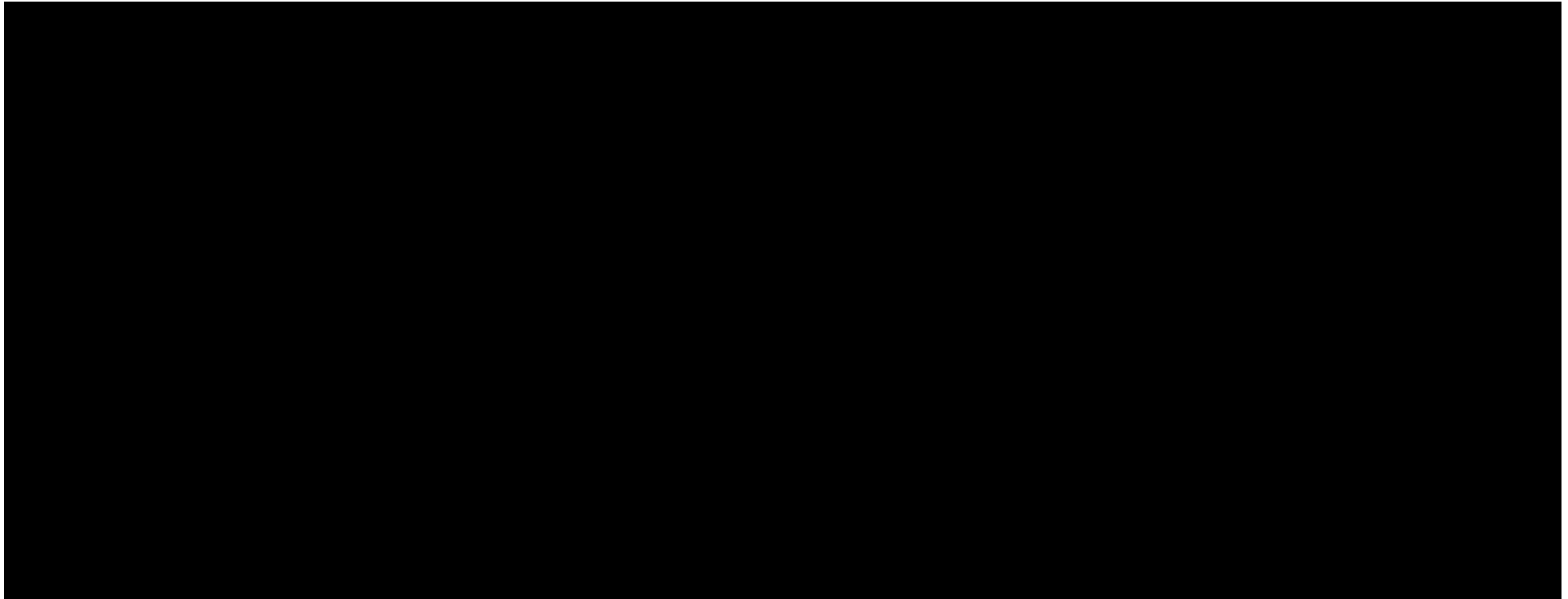
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



[1]: Chodorow Report I, Section VI.B.

[2]: Chodorow Report I, Section VI.B.

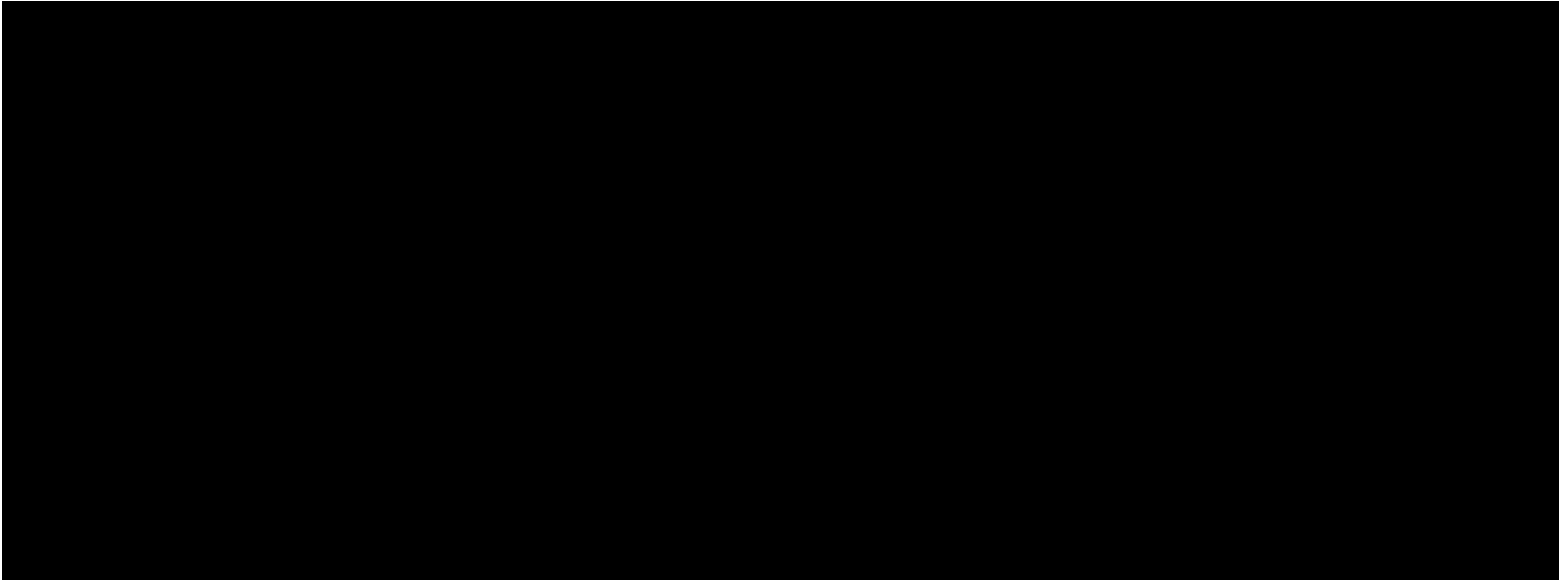
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI.B.

[2]: Chodorow Report I, Section VI.B.

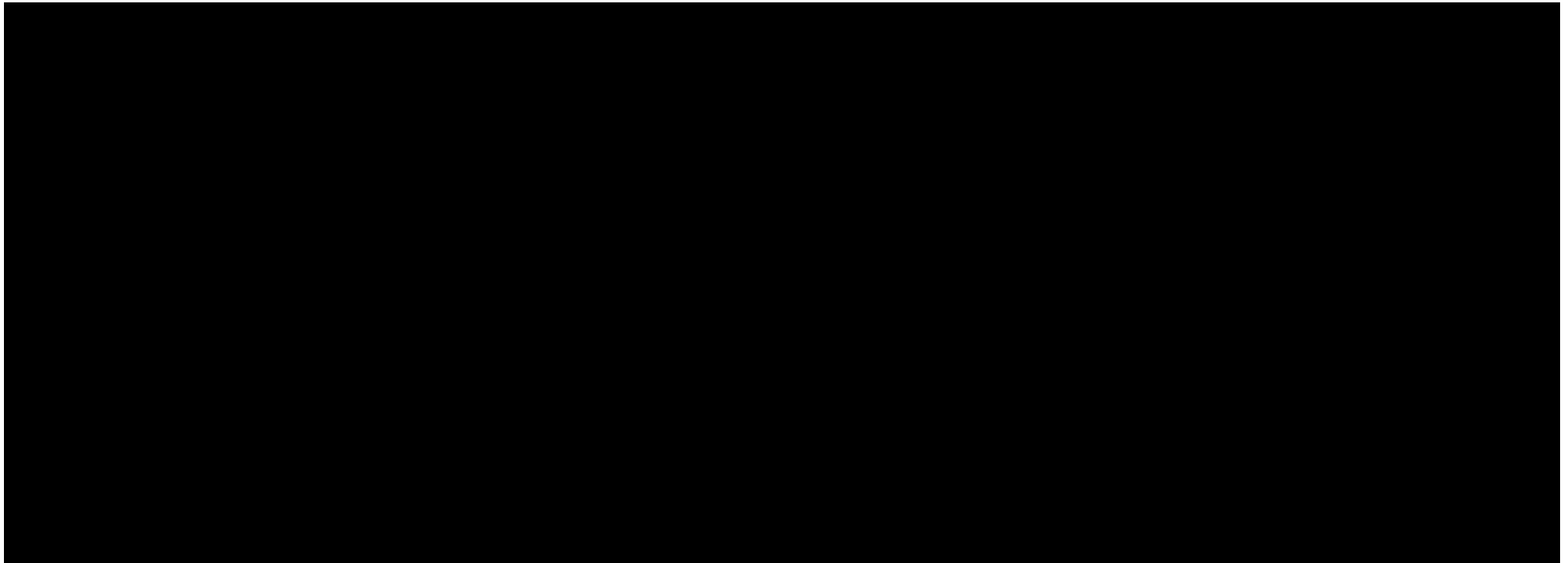
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI.B.

[2]: Chodorow Report I, Section VI.B.

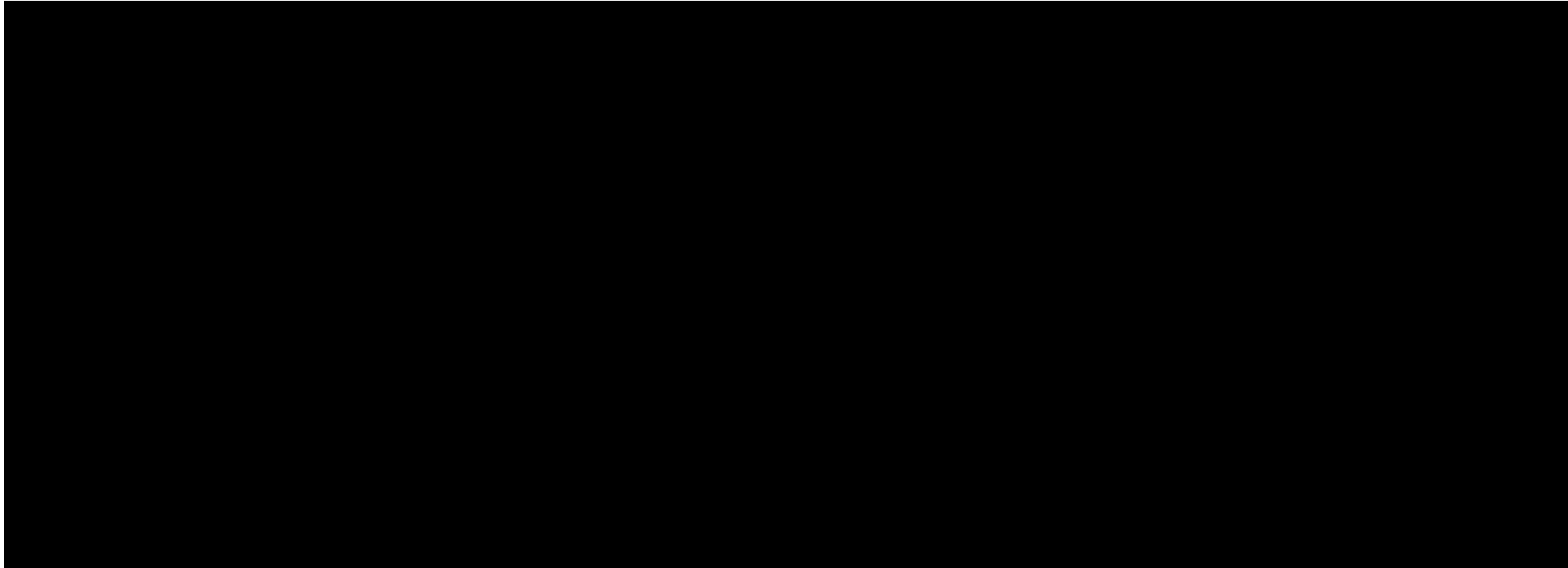
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI.B.

[2]: Chodorow Report I, Section VI.B.

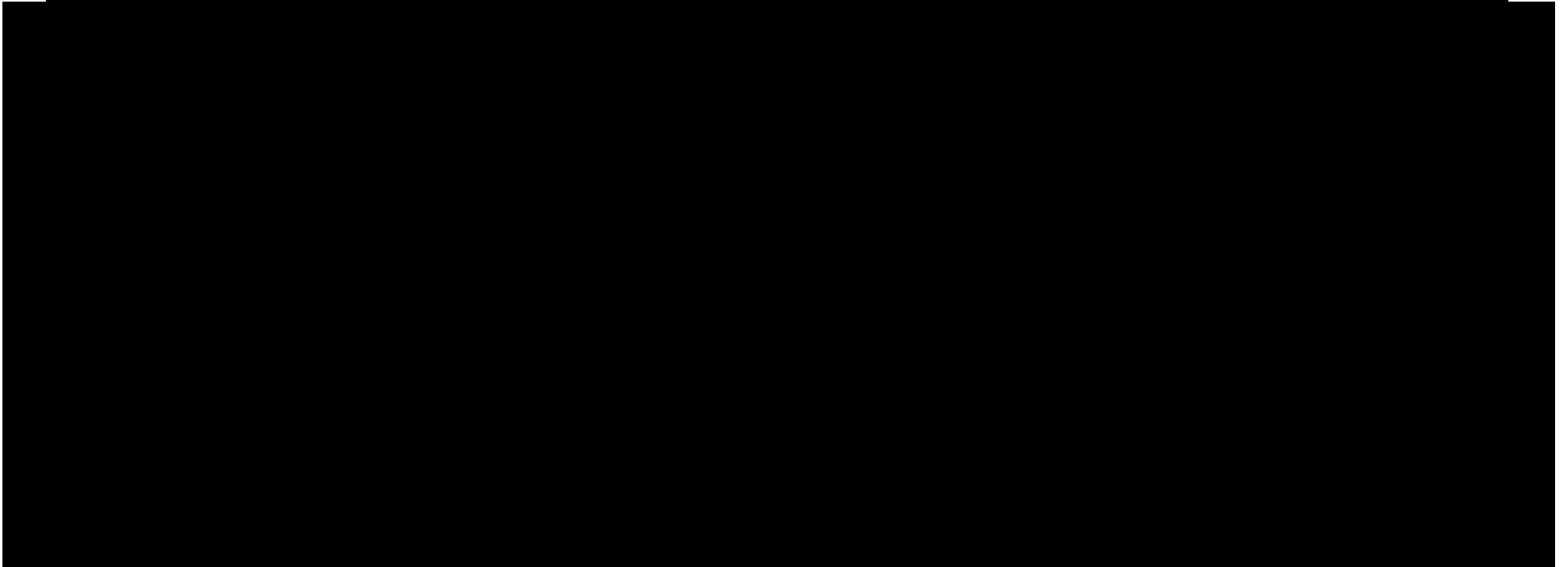
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI.B.

[2]: Chodorow Report I, Section VI.B.

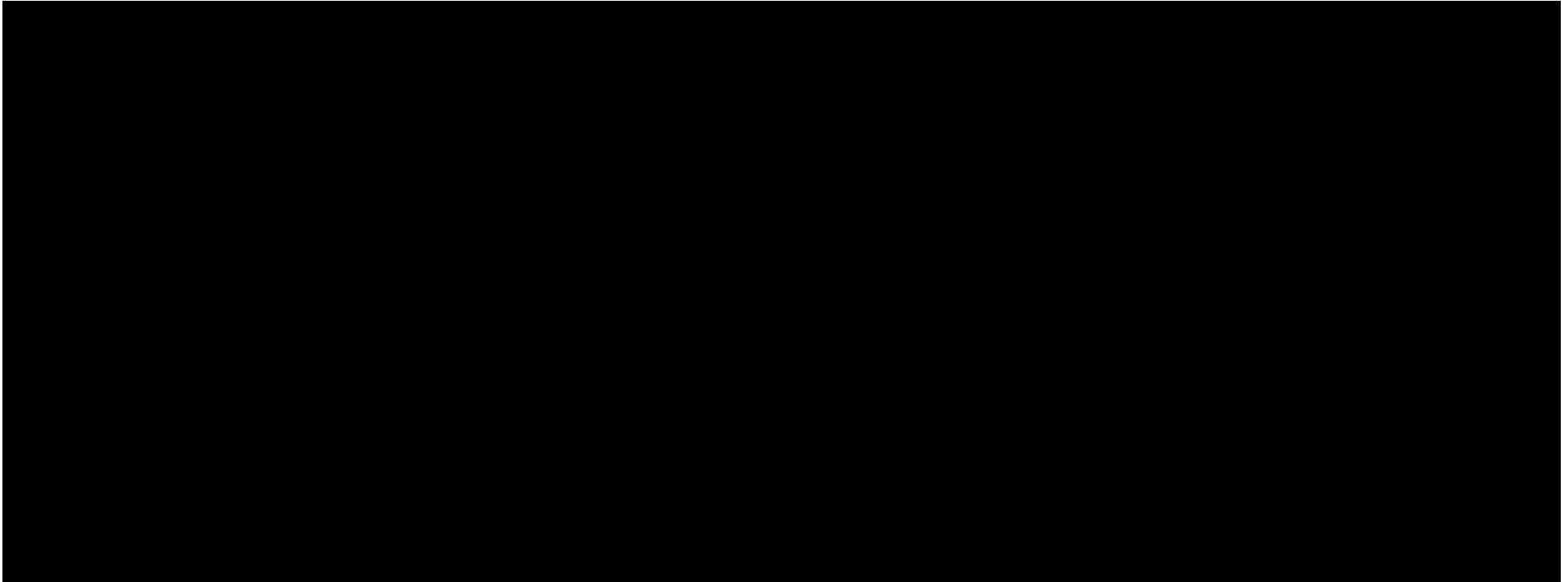
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table D.2: Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI.B.

[2]: Chodorow Report I, Section VI.B.

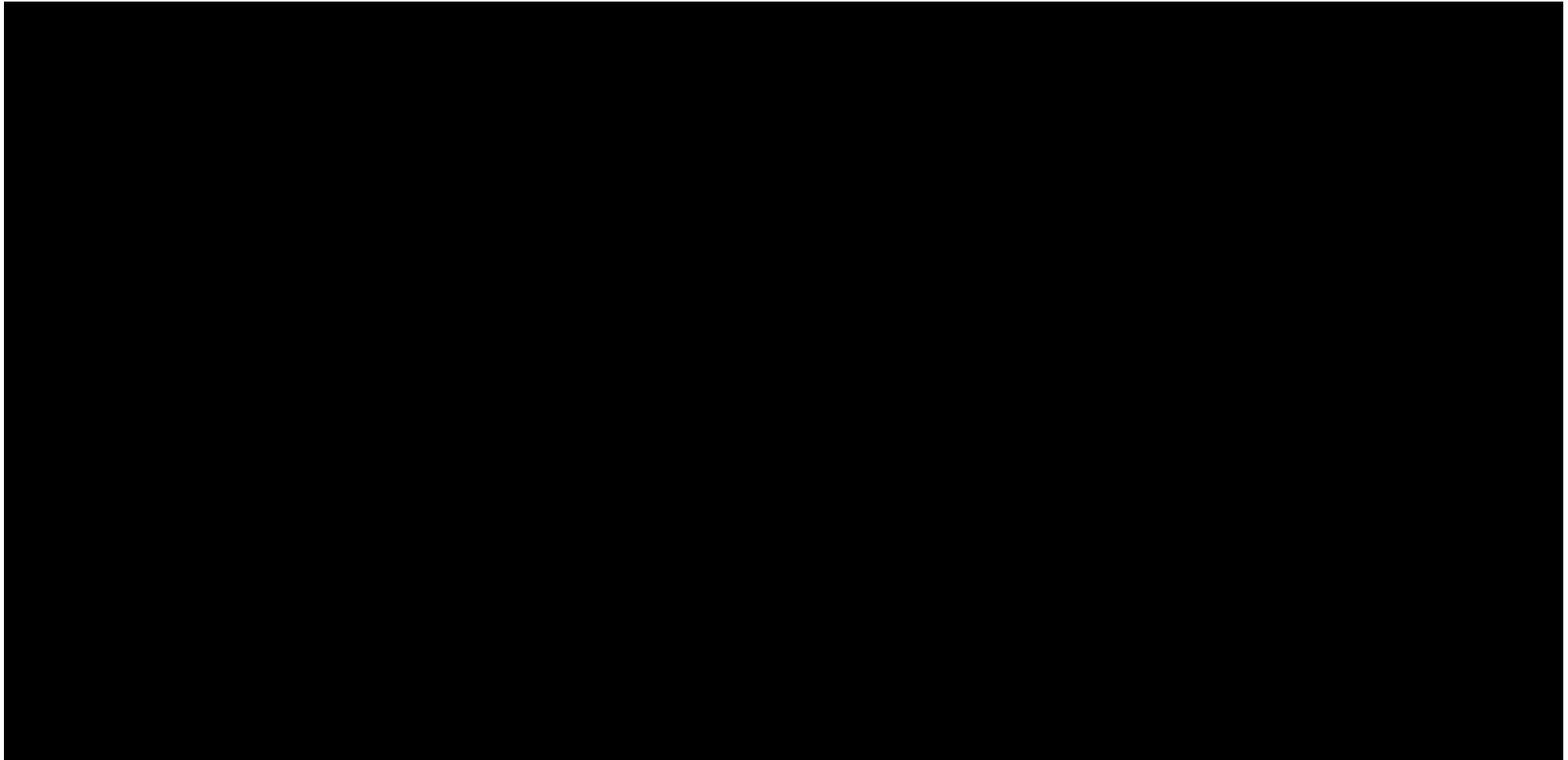
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table D.3: Brattle Schedule 3
Price and Freight (2007 US\$ per ton)**



Sources & Notes:

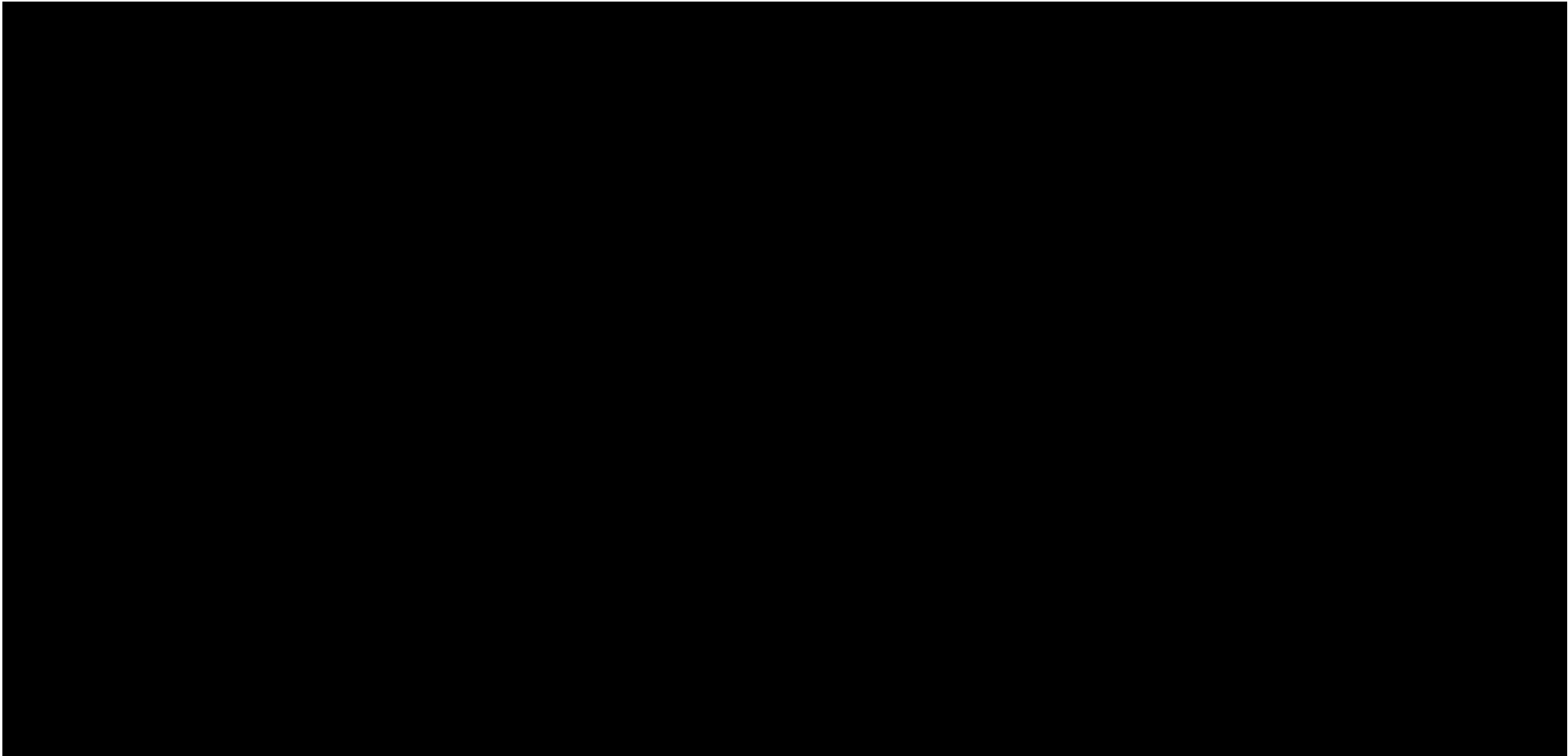
[1]: Table D.13.

[2]: Table D.14.

[3]: $0.125\% \times ([1] - [2])$.

[4]: $[1] - [2] - [3]$.

**Table D.3: Brattle Schedule 3
Price and Freight (2007 US\$ per ton)**



Sources & Notes:

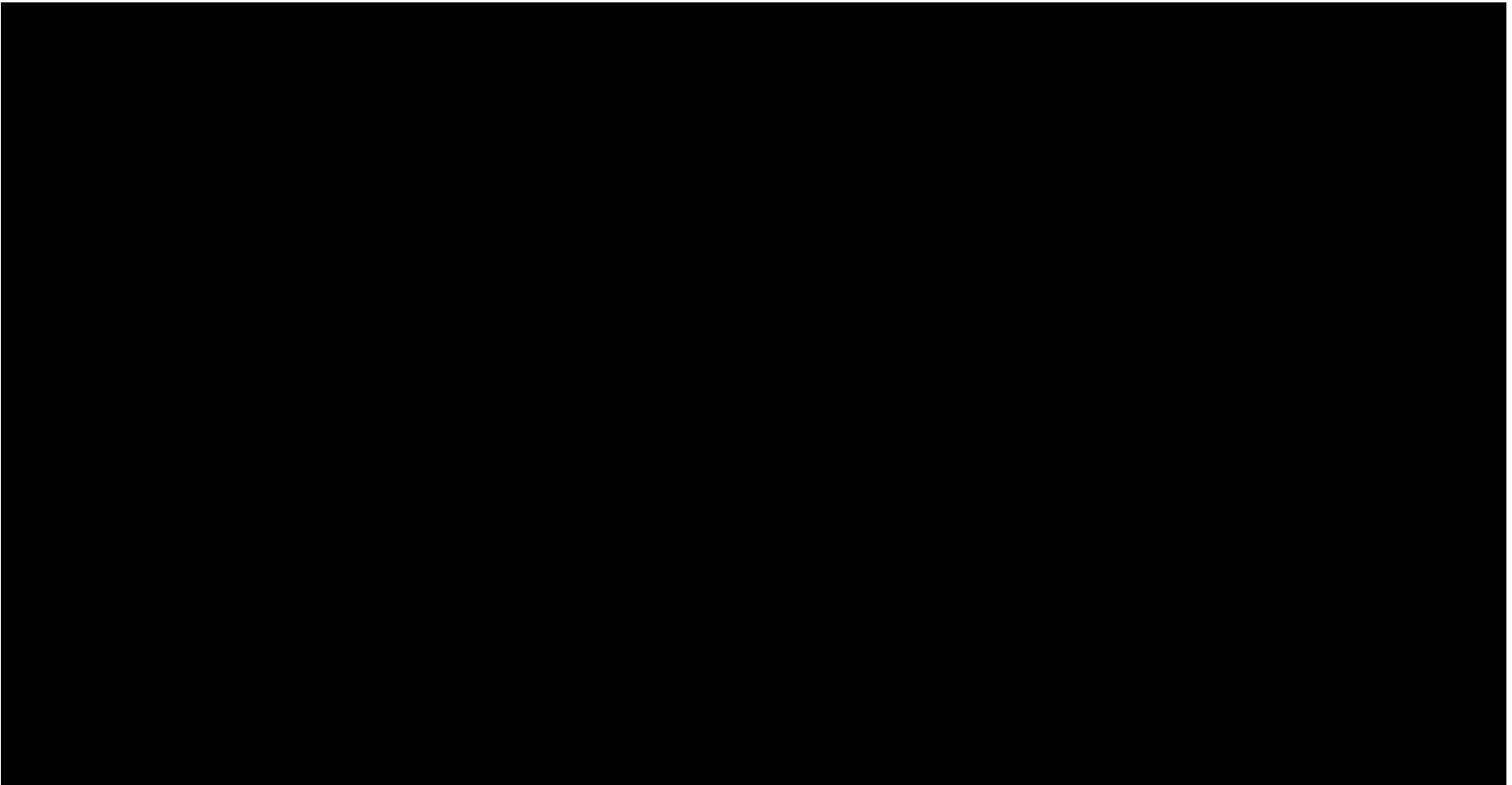
[1]: Table D.13.

[2]: Table D.14.

[3]: $0.125\% \times ([1] - [2])$.

[4]: $[1] - [2] - [3]$.

**Table D.3: Brattle Schedule 3
Price and Freight (2007 US\$ per ton)**



Sources & Notes:

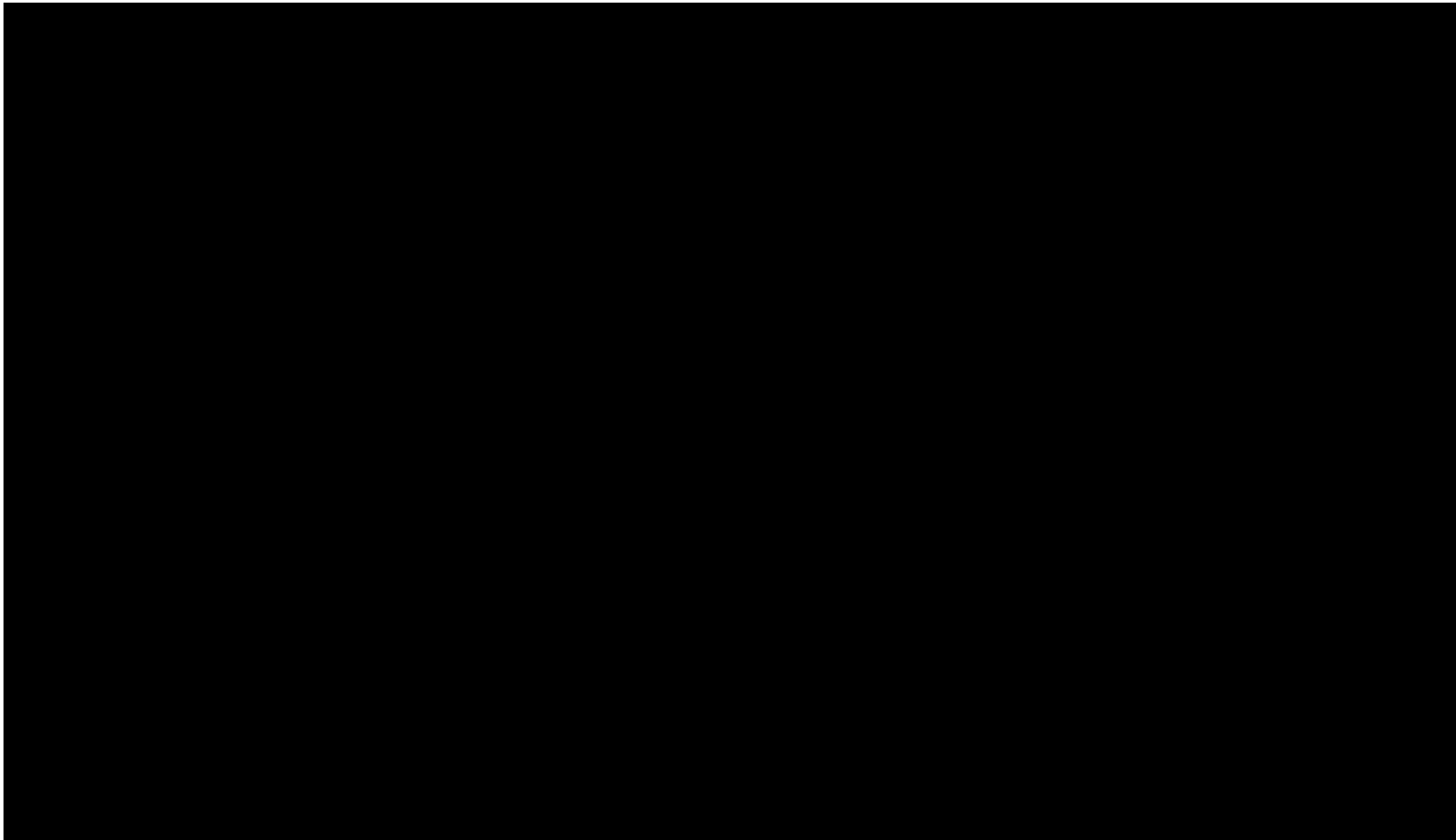
[1]: Table D.13.

[2]: Table D.14.

[3]: $0.125\% \times ([1] - [2])$.

[4]: $[1] - [2] - [3]$.

**Table D.3: Brattle Schedule 3
Price and Freight (2007 US\$ per ton)**



Sources & Notes:

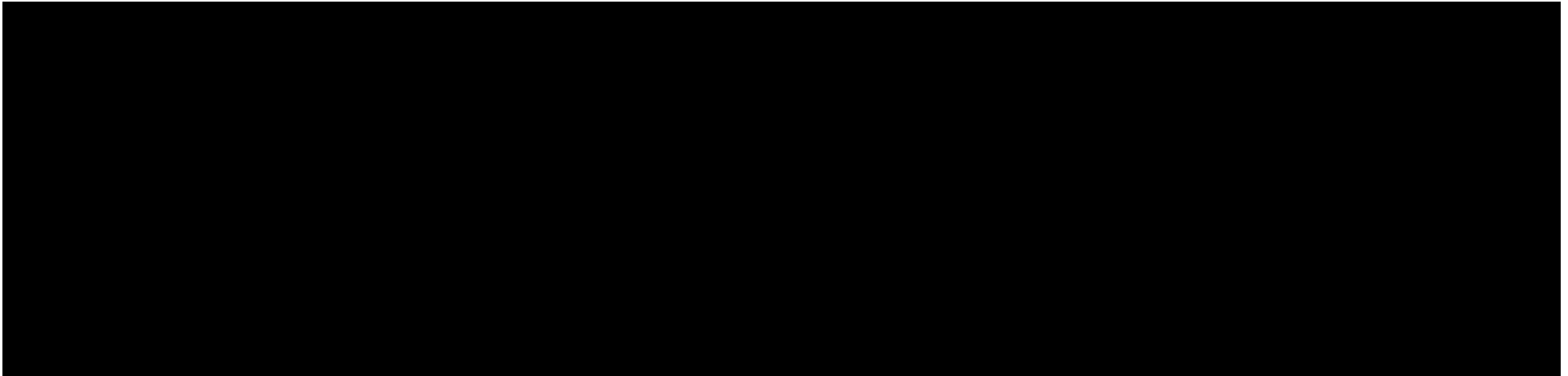
[1]: Table D.13.

[2]: Table D.14.

[3]: $0.125\% \times ([1] - [2])$.

[4]: $[1] - [2] - [3]$.

**Table D.4: Brattle Schedule 4
Operating Costs
(Converted to 2007 \$US per ton)**



Sources & Notes:

[1]: Canadian CPI, Bloomberg.

[2]: Nominal year in which values were reported in the Rosen Report I and SCMA Report I.

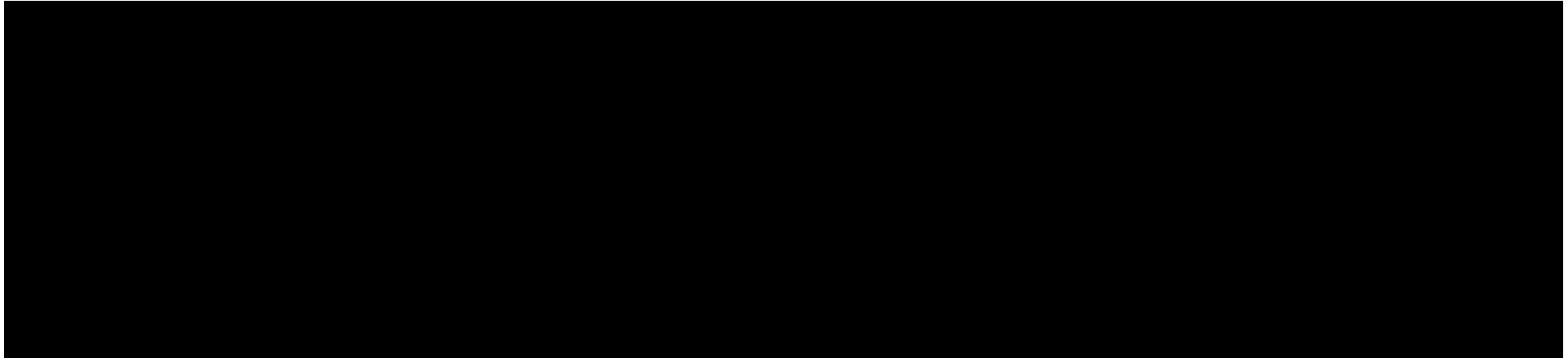
[3]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table D.15.

[5]: SCMA Report I.

[6]: $[5] \times [3] / [4]$.

**Table D.4: Brattle Schedule 4
Operating Costs
(Converted to 2007 \$US per ton)**



Sources & Notes:

[1]: Canadian CPI, Bloomberg.

[2]: Nominal year in which values were reported in the Rosen Report I and SCMA Report I.

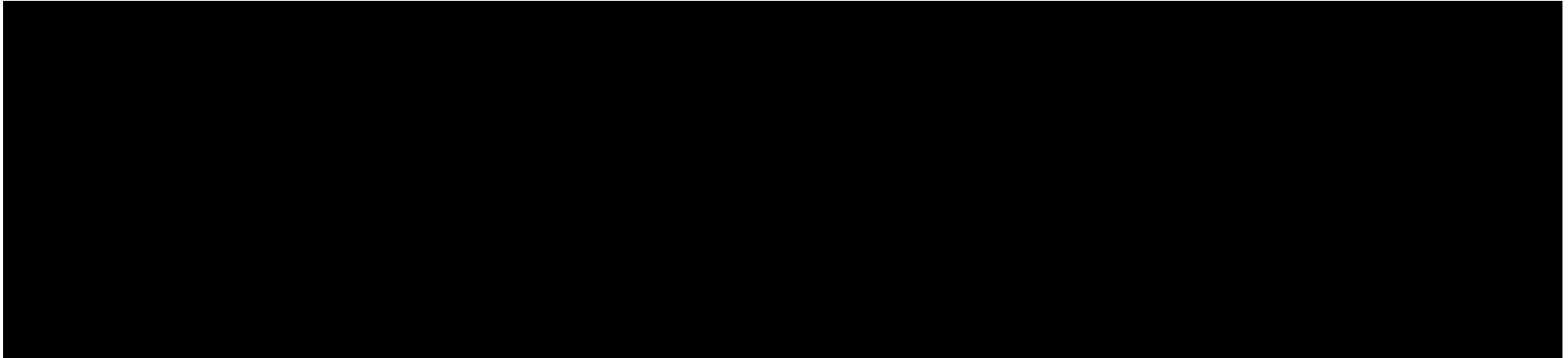
[3]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table D.15.

[5]: SCMA Report I.

[6]: $[5] \times [3] / [4]$.

**Table D.4: Brattle Schedule 4
Operating Costs
(Converted to 2007 \$US per ton)**



Sources & Notes:

[1]: Canadian CPI, Bloomberg.

[2]: Nominal year in which values were reported in the Rosen Report I and SCMA Report I.

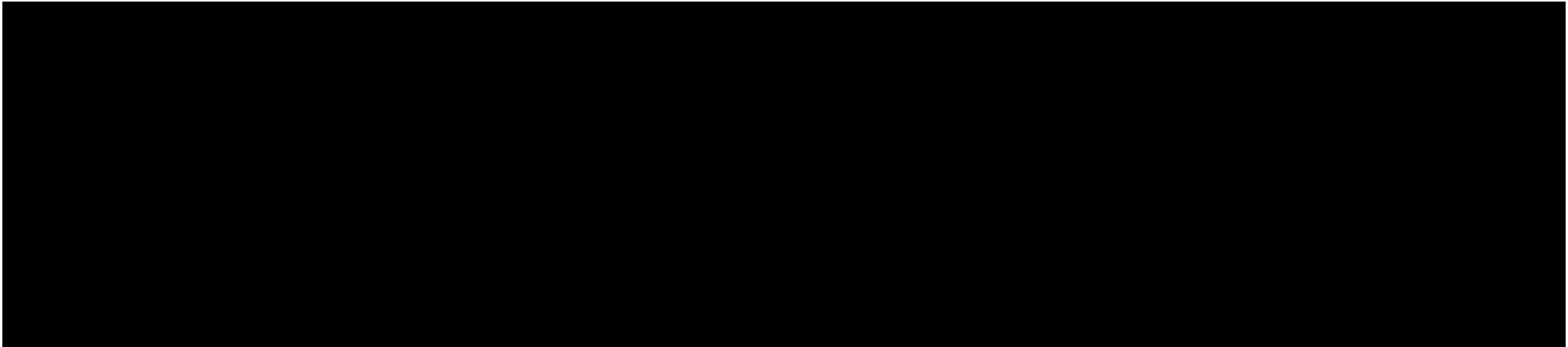
[3]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table D.15.

[5]: SCMA Report I.

[6]: $[5] \times [3] / [4]$.

**Table D.4: Brattle Schedule 4
Operating Costs
(Converted to 2007 \$US per ton)**



Sources & Notes:

[1]: Canadian CPI, Bloomberg.

[2]: Nominal year in which values were reported in the Rosen Report I and SCMA Report I.

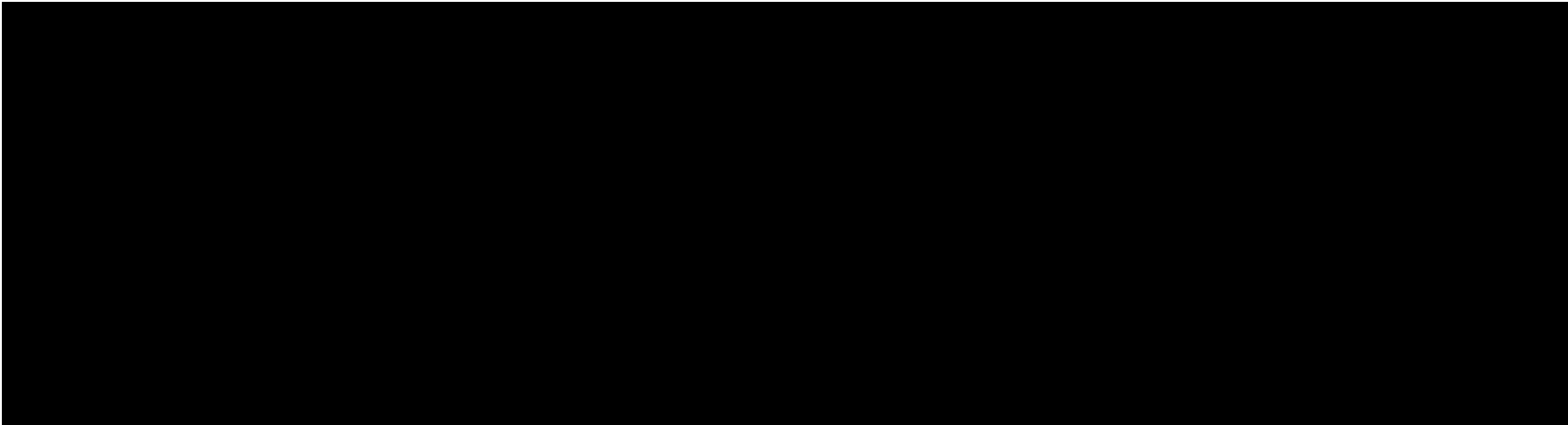
[3]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table D.15.

[5]: SCMA Report I.

[6]: $[5] \times [3] / [4]$.

**Table D.4: Brattle Schedule 4
Operating Costs
(Converted to 2007 \$US per ton)**



Sources & Notes:

[1]: Canadian CPI, Bloomberg.

[2]: Nominal year in which values were reported in the Rosen Report I and SCMA Report I.

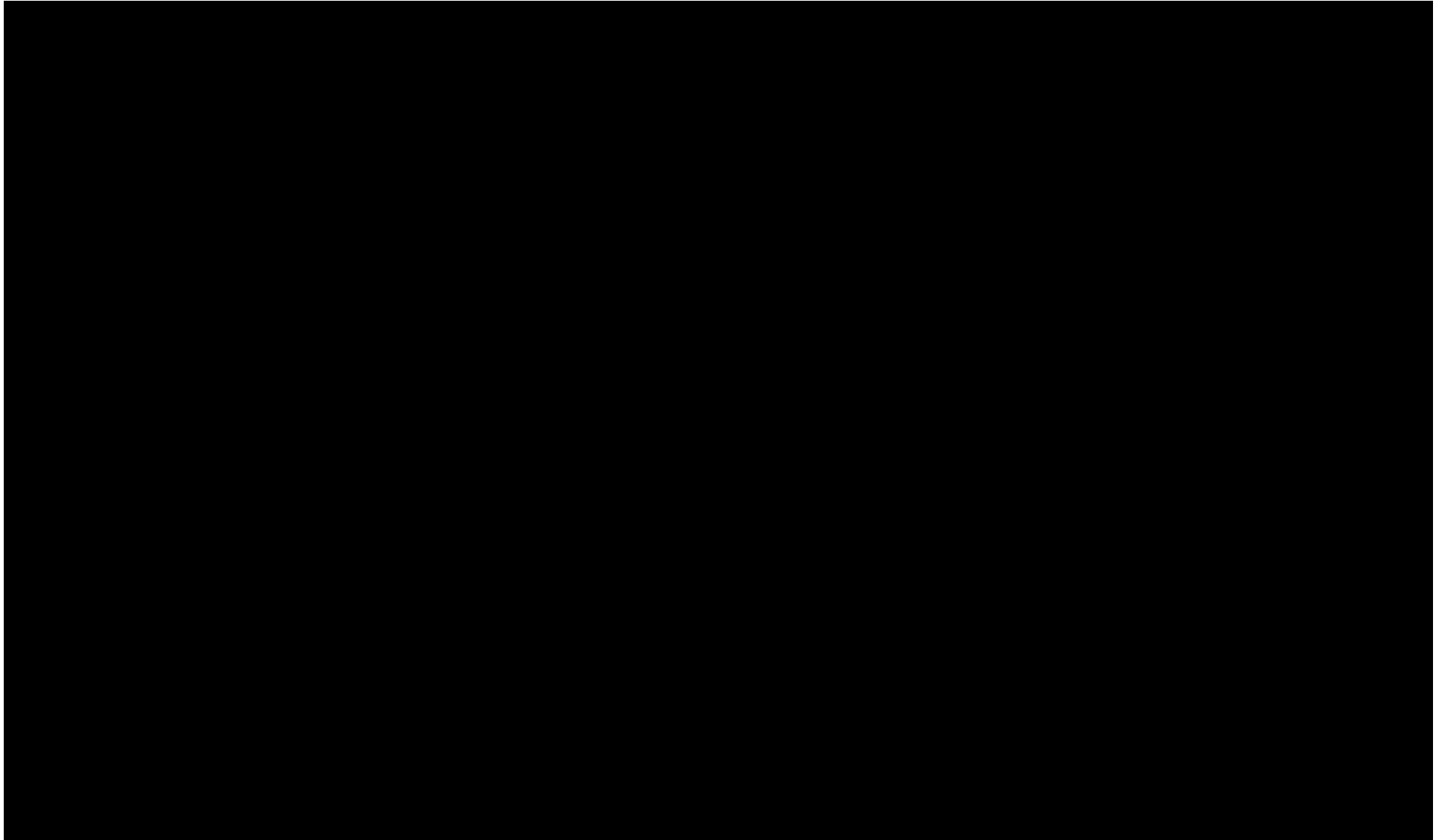
[3]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table D.15.

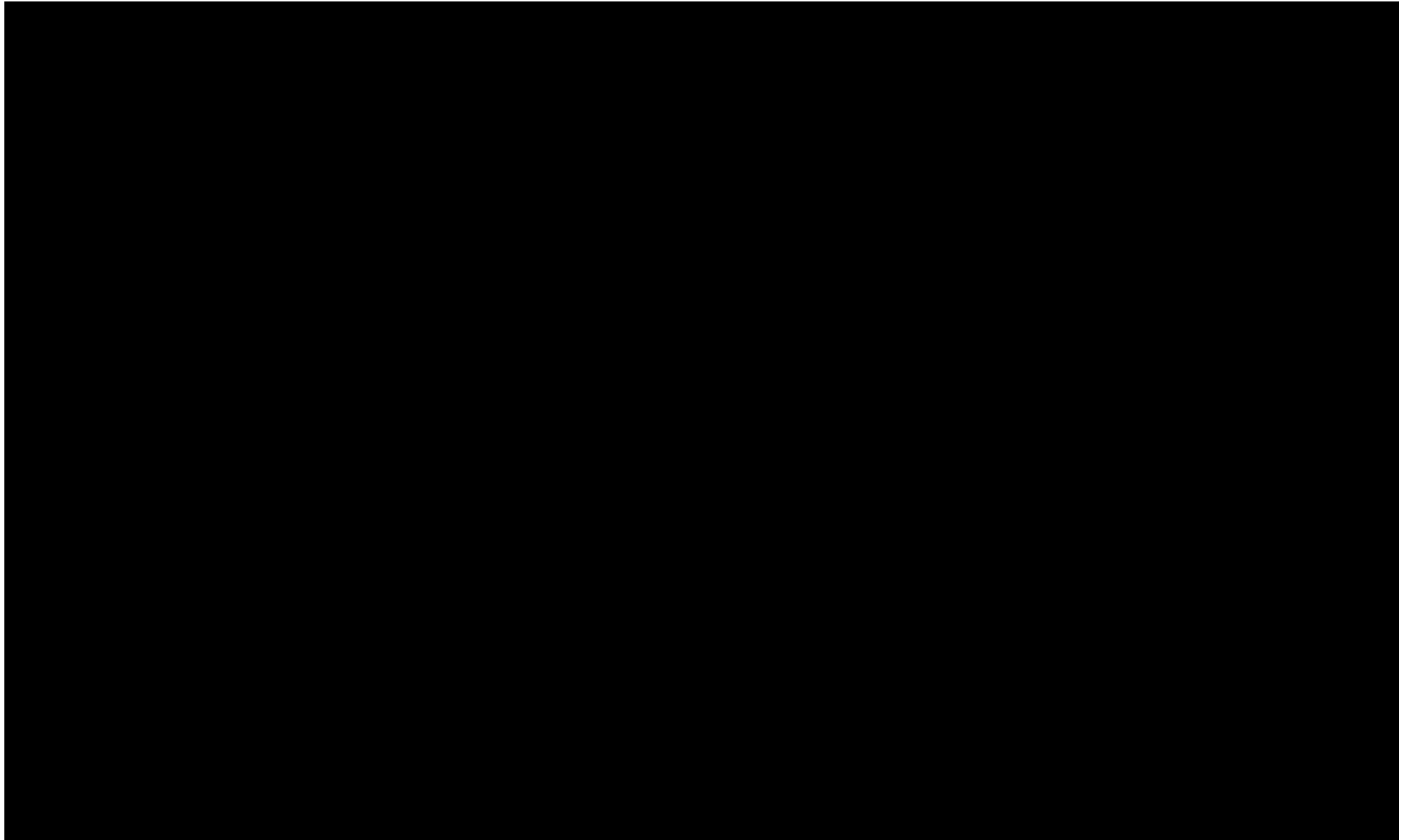
[5]: SCMA Report I.

[6]: $[5] \times [3] / [4]$.

**Table D.5: Brattle Schedule 5
Capital Expenditures
(Converted to 2007 \$US)**



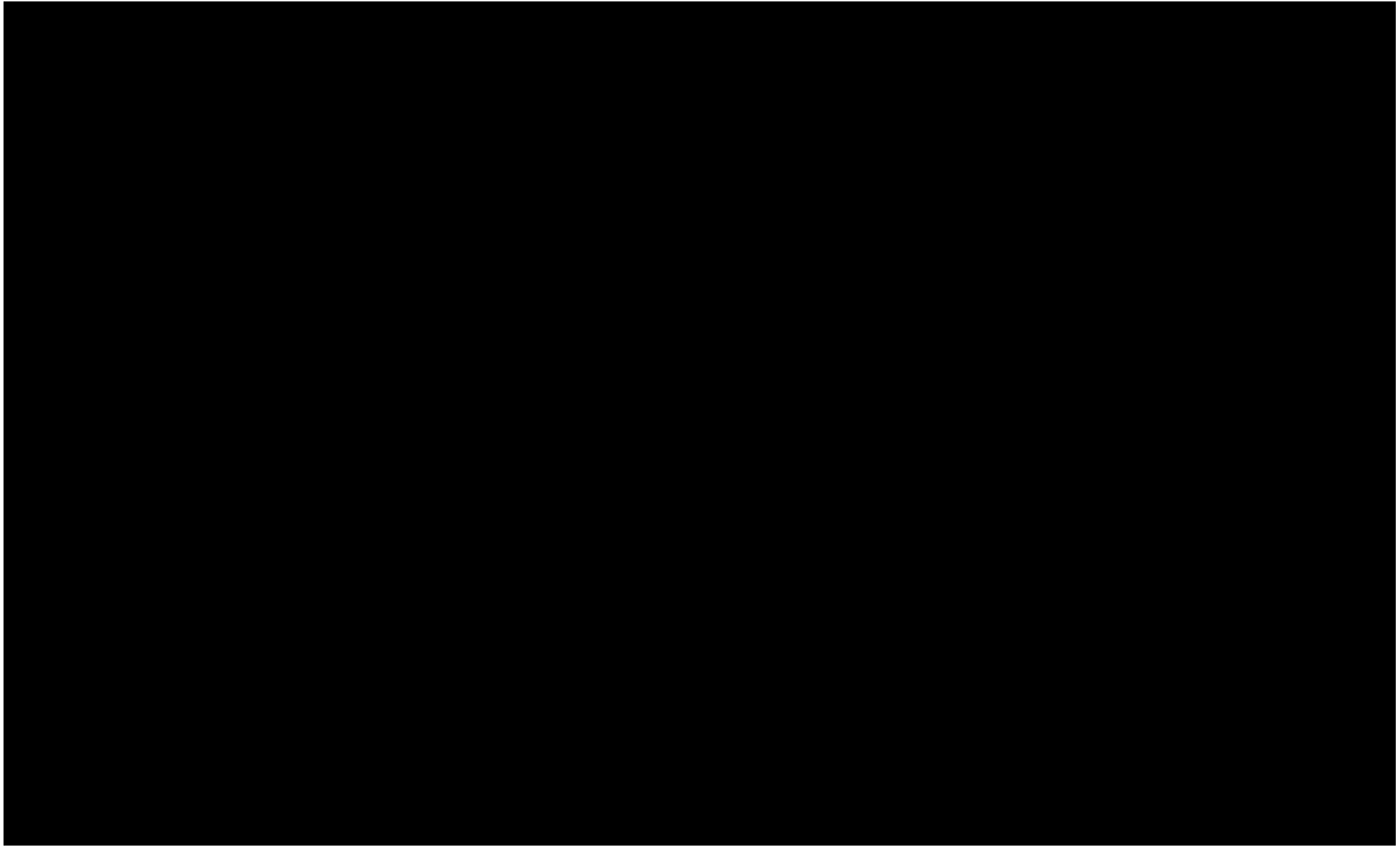
**Table D.5: Brattle Schedule 5
Capital Expenditures
(Converted to 2007 \$US)**



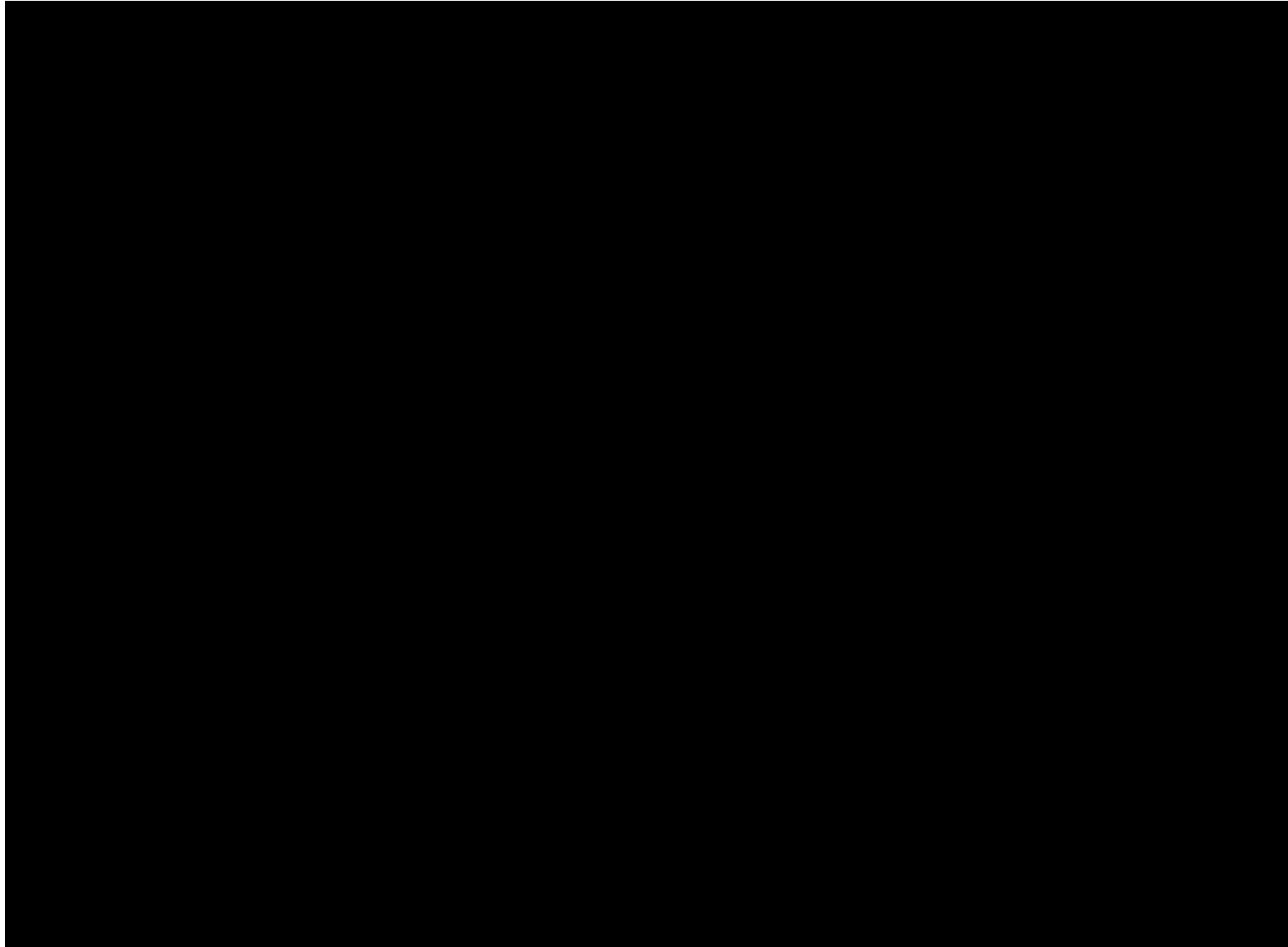
**Table D.5: Brattle Schedule 5
Capital Expenditures
(Converted to 2007 \$US)**



**Table D.5: Brattle Schedule 5
Capital Expenditures
(Converted to 2007 \$US)**



**Table D.5: Brattle Schedule 5
Capital Expenditures
(Converted to 2007 \$US)**



**Table D.5: Brattle Schedule 5
Capital Expenditures**

Sources & Notes:

[1]: C/US\$ foreign exchanges rates, Bloomberg.

[2]: Table D.15.

[3]: U.S. CPI, Bloomberg.

[4]: Canadian CPI, Bloomberg.

[5], [9], [12], [15], [19], [23]: Rosen Report I, Schedule [REDACTED], per C-1342, p.17.

Costs for additional equipment specified in the SCMA Report I are added to Initial Outlays 2009 and 2010.

[6]: The sum of [5].

[7]: $1 / (1 + [3])^{0.19}$ using [3] from 2007 x $1 / (1 + [3])^{0.5}$ using [3] from 2008.

[8]: [6] x [7].

[10]: $1 / (1 + [3])^{0.19}$ using [3] from 2007 x $1 / (1 + [3])^{0.5}$ using [3] from 2008.

[11]: [9] x [10].

[12]: Mr. Rosen's calculated marine load-out facility costs in nominal US\$. [REDACTED]

[13]: $1 / (1 + [3])^{0.19}$ using [3] from 2007, multiplied by $1 / (1 + [3])^1$ using [3] from years between 2007 and the current year, multiplied by $1 / (1 + [3])^{0.5}$ using [3] from the current year

[14]: [12] x [13].

[16]: $1 / (1 + [4])^{0.19}$ using [4] from 2007, multiplied by $1 / (1 + [4])^1$ using [4] from years between 2007 and the current year,

[17]: [15] x [16].

[18]: [17] / [2].

[20]: $1 / (1 + [4])^{0.19}$ using [4] from 2007, multiplied by $1 / (1 + [4])^1$ using [4] from years between 2007 and the current year, multiplied by $1 / (1 + [4])^{0.5}$ using [4]

[21]: [19] x [20].

[22]: [21] / [2].

[24]: $1 / (1 + [3])^{0.19}$ using [3] from 2007, multiplied by $1 / (1 + [3])^1$ using [3] from years between 2007 and the current year, multiplied by $1 / (1 + [3])^{0.5}$ using [3] from the current year

[25]: [23] x [24].

[26]: [8] + [11] + [14] + [18] + [22] + [25]. Mr. Rosen excludes land acquisition costs, which are included here.

Table D.6: Brattle Schedule 6
Maintenance Costs - Mobile Equipment
(Converted to 2007 US\$)

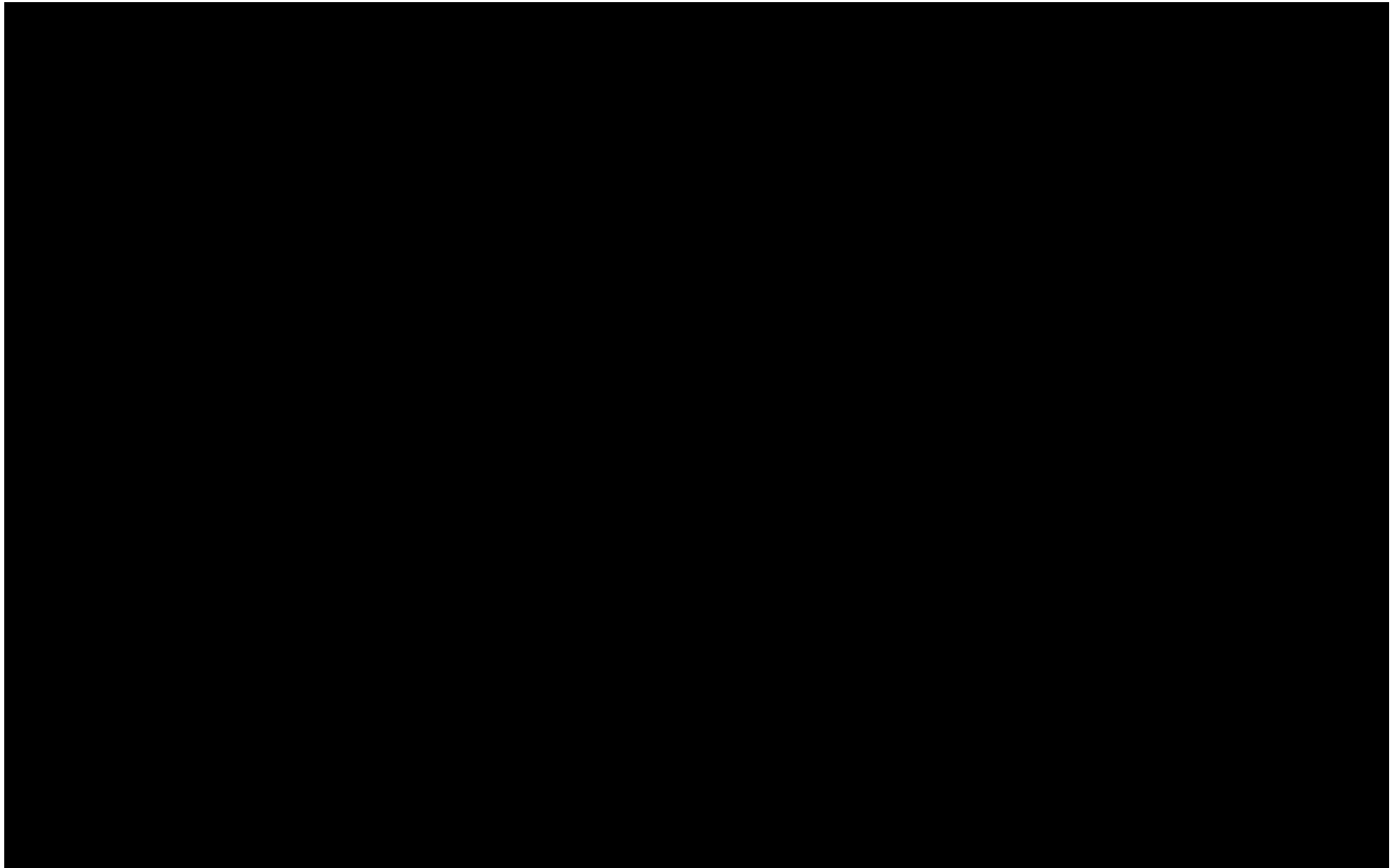


Table D.6: Brattle Schedule 6
Maintenance Costs - Mobile Equipment
(Converted to 2007 US\$)

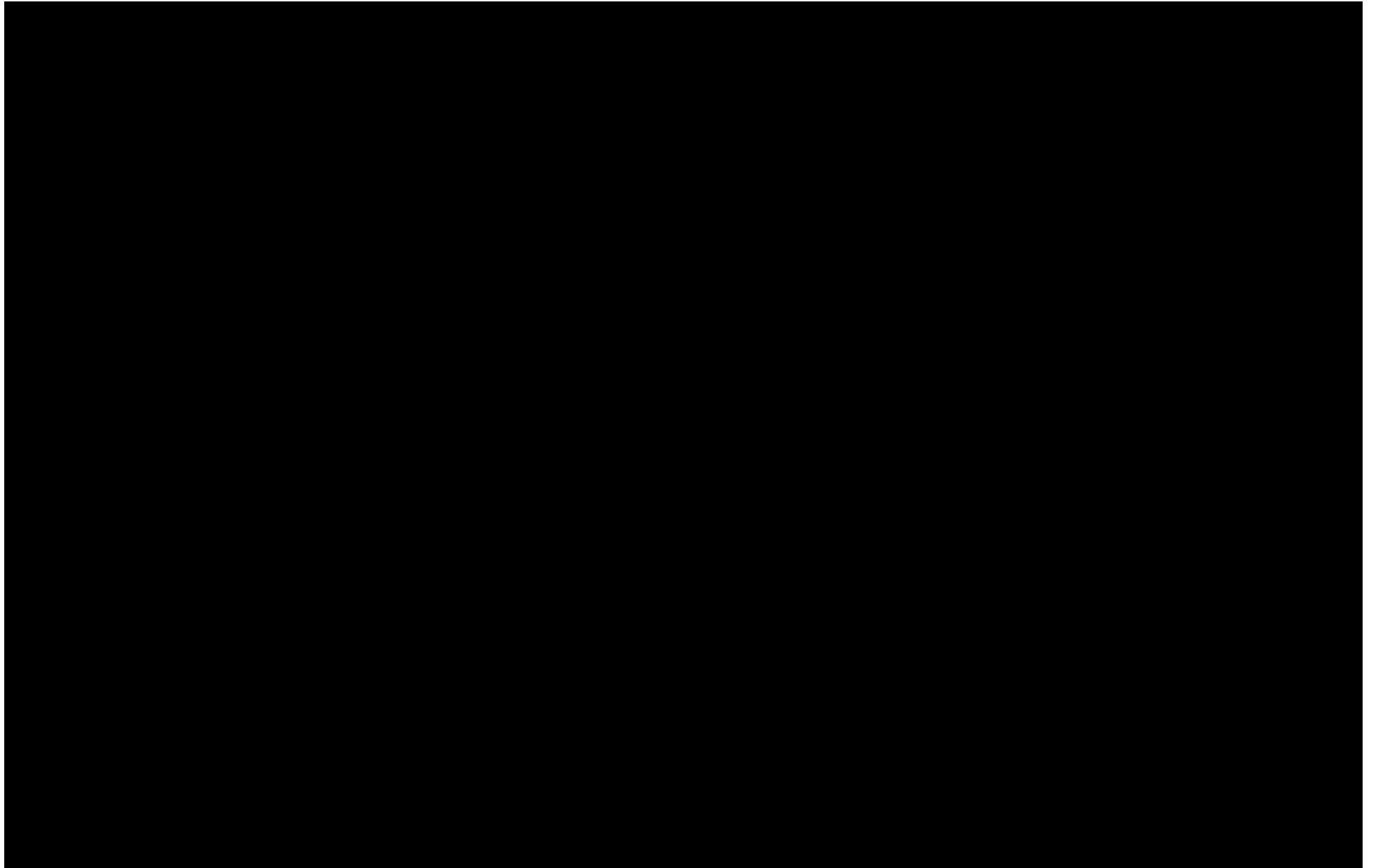


Table D.6: Brattle Schedule 6
Maintenance Costs - Mobile Equipment
(Converted to 2007 US\$)

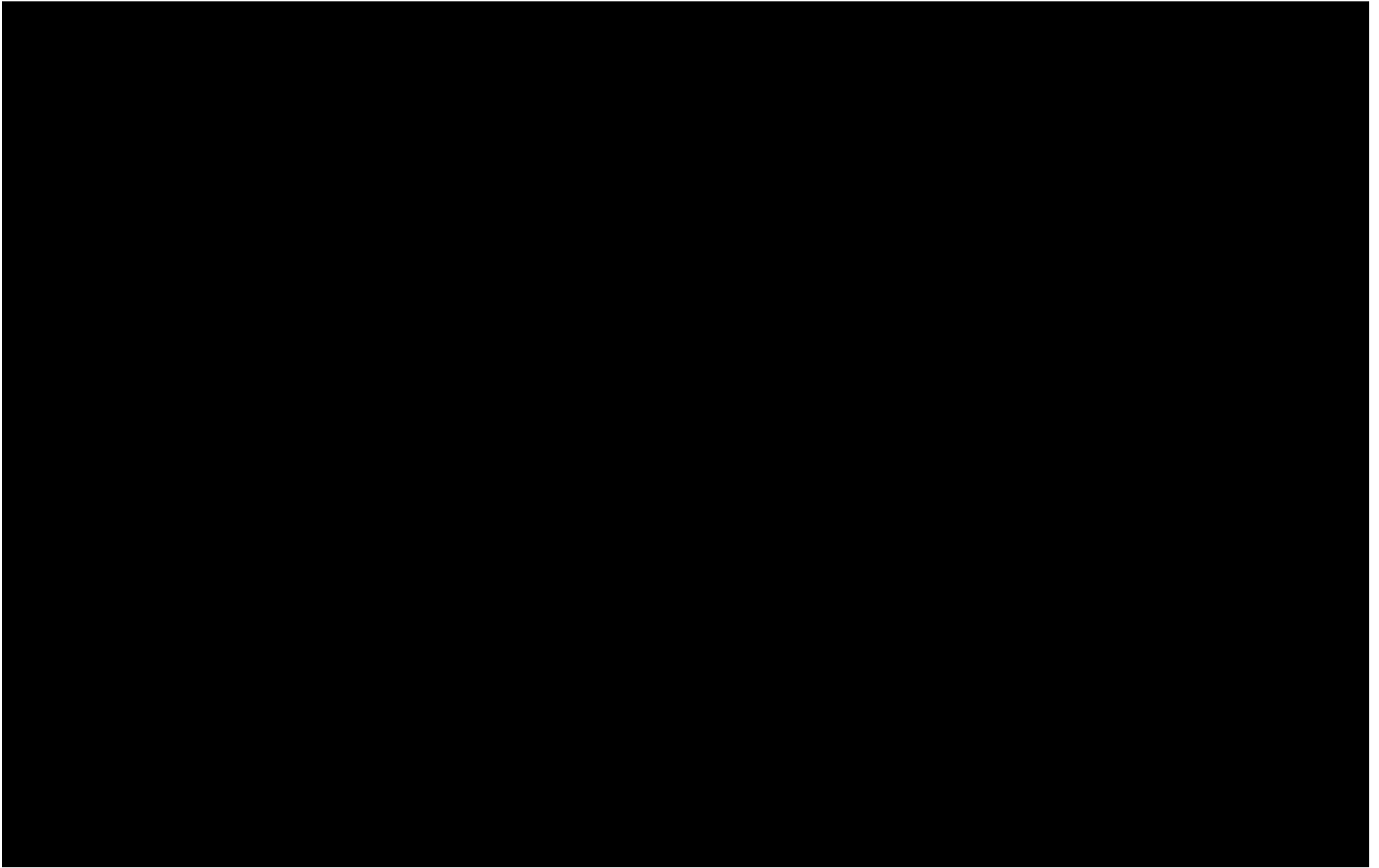
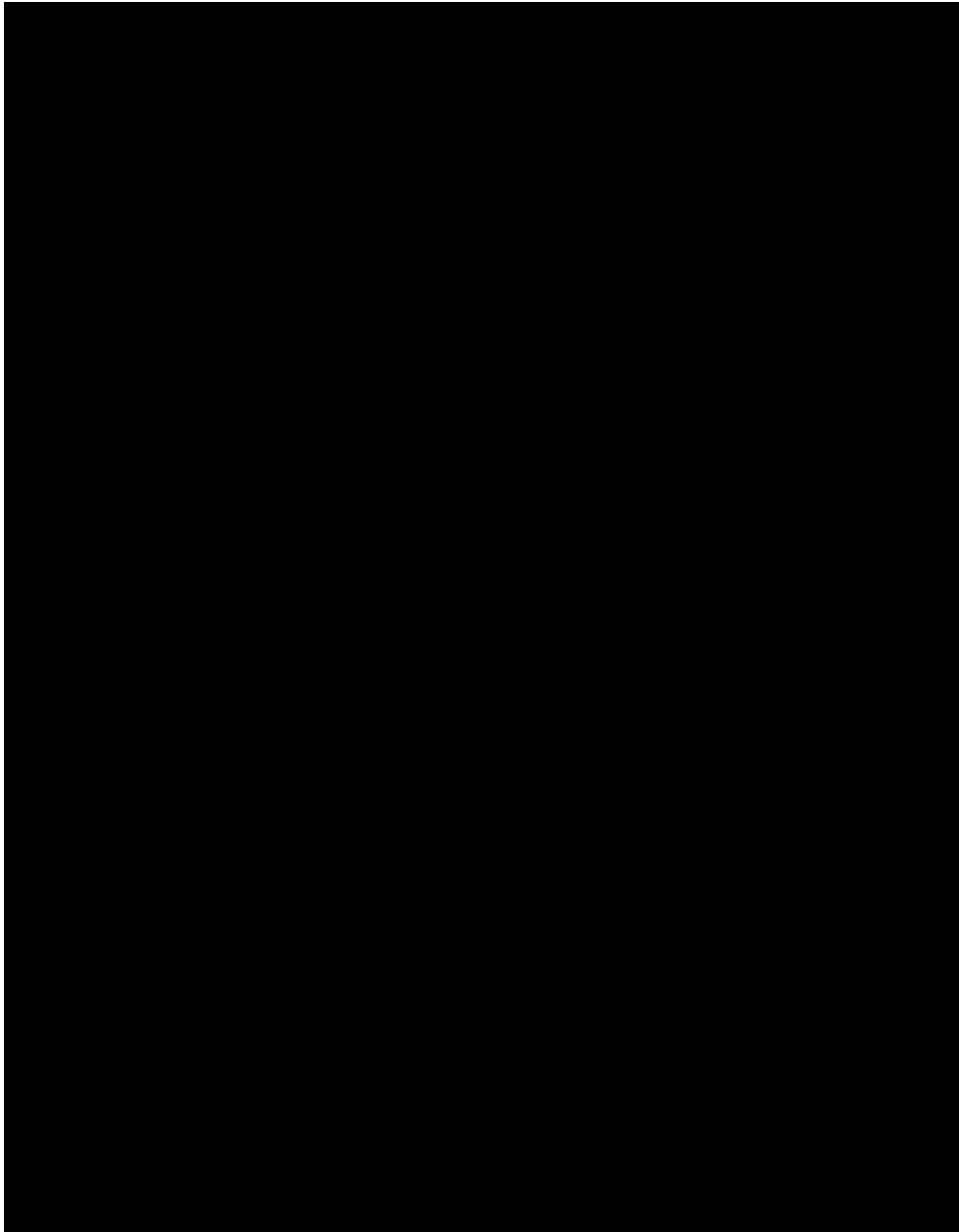


Table D.6: Brattle Schedule 6
Maintenance Costs - Mobile Equipment
(Converted to 2007 US\$)



**Table D.6: Brattle Schedule 6
Maintenance Costs - Mobile Equipment**

Sources & Notes:

[1]: Rosen Report I, Schedule 6. [REDACTED]. See SCMA Report I.

[2]: U.S. CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen Report I.

[4]: $1 / ((1 + [2]) ^ 0.19)$ using [2] from 2007, multiplied by $1 / ((1 + [2]) ^ 0.5)$ using [2] from 2008.

[5]: Production Factor. See SCMA Rejoinder Report and SCMA Report I.

[6]: [1] x [4].

[7]: 1% of [6] in Year 1 and Year 2, 2% in Year 3 onward.

[8]: [5] x 1% of [6] in Year 1 and Year 2, [5] x 2% of [6] in Year 3 onward.

[9]: The sum of [7] through [8].

Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)

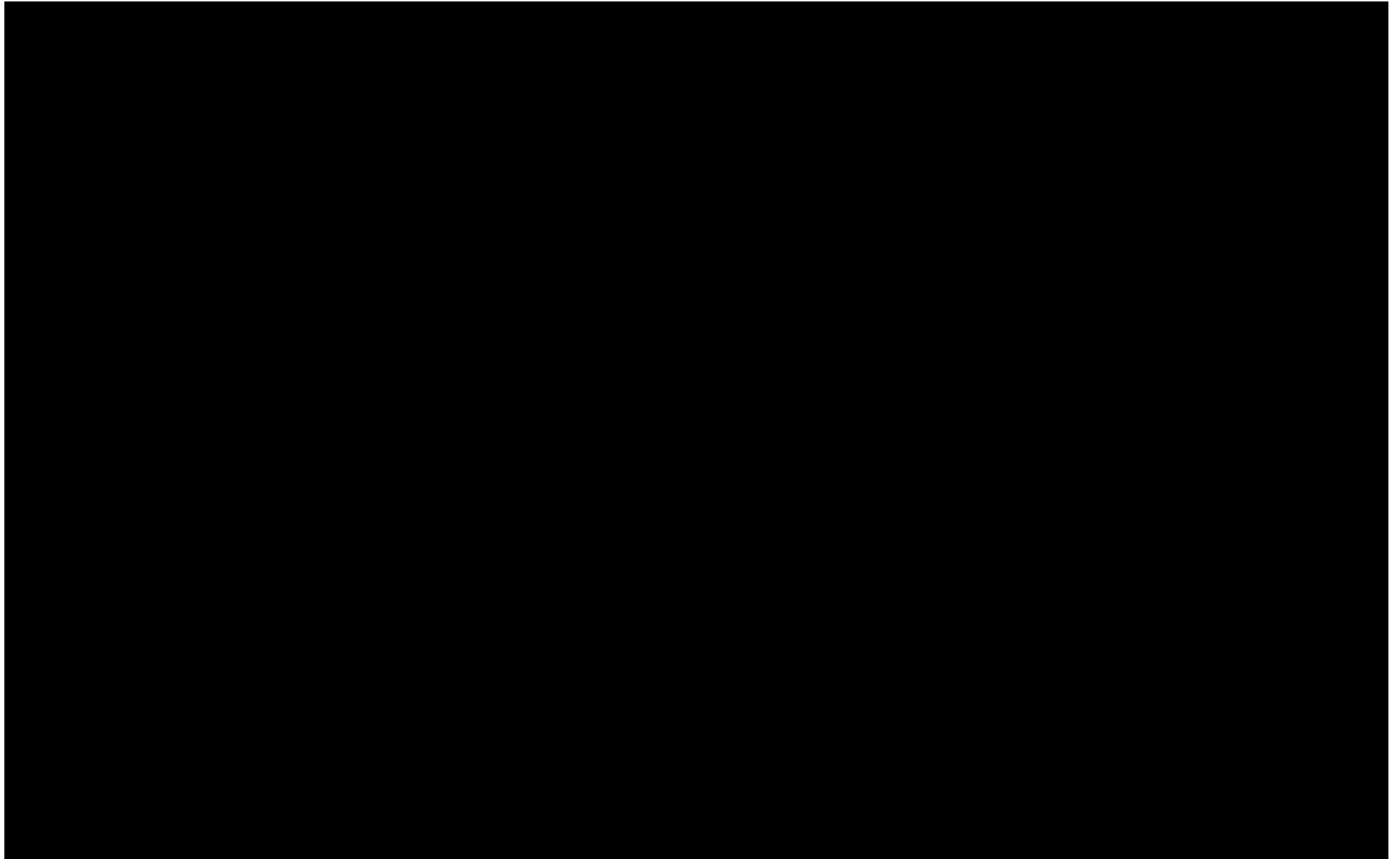


Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)

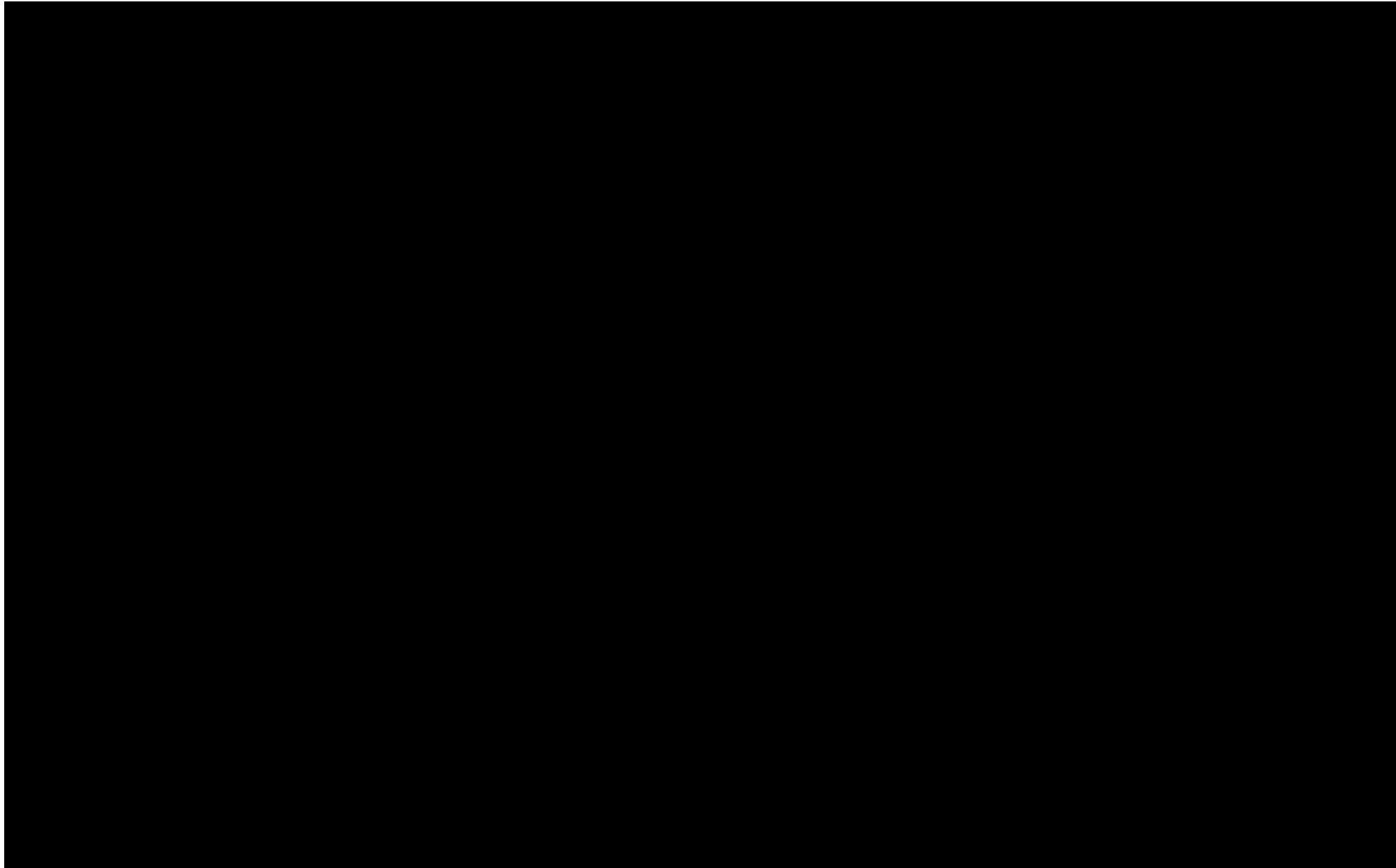


Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)

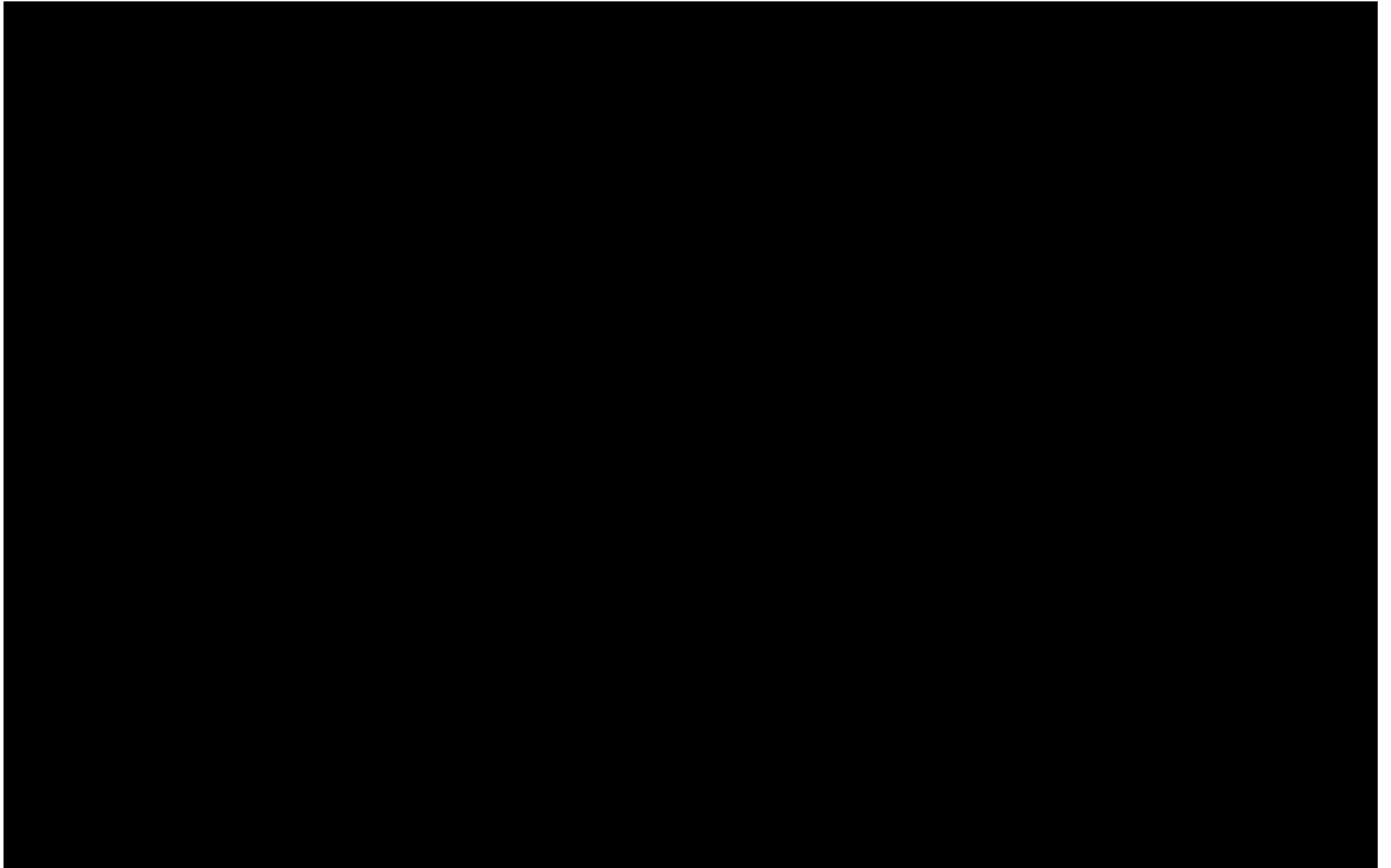


Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)

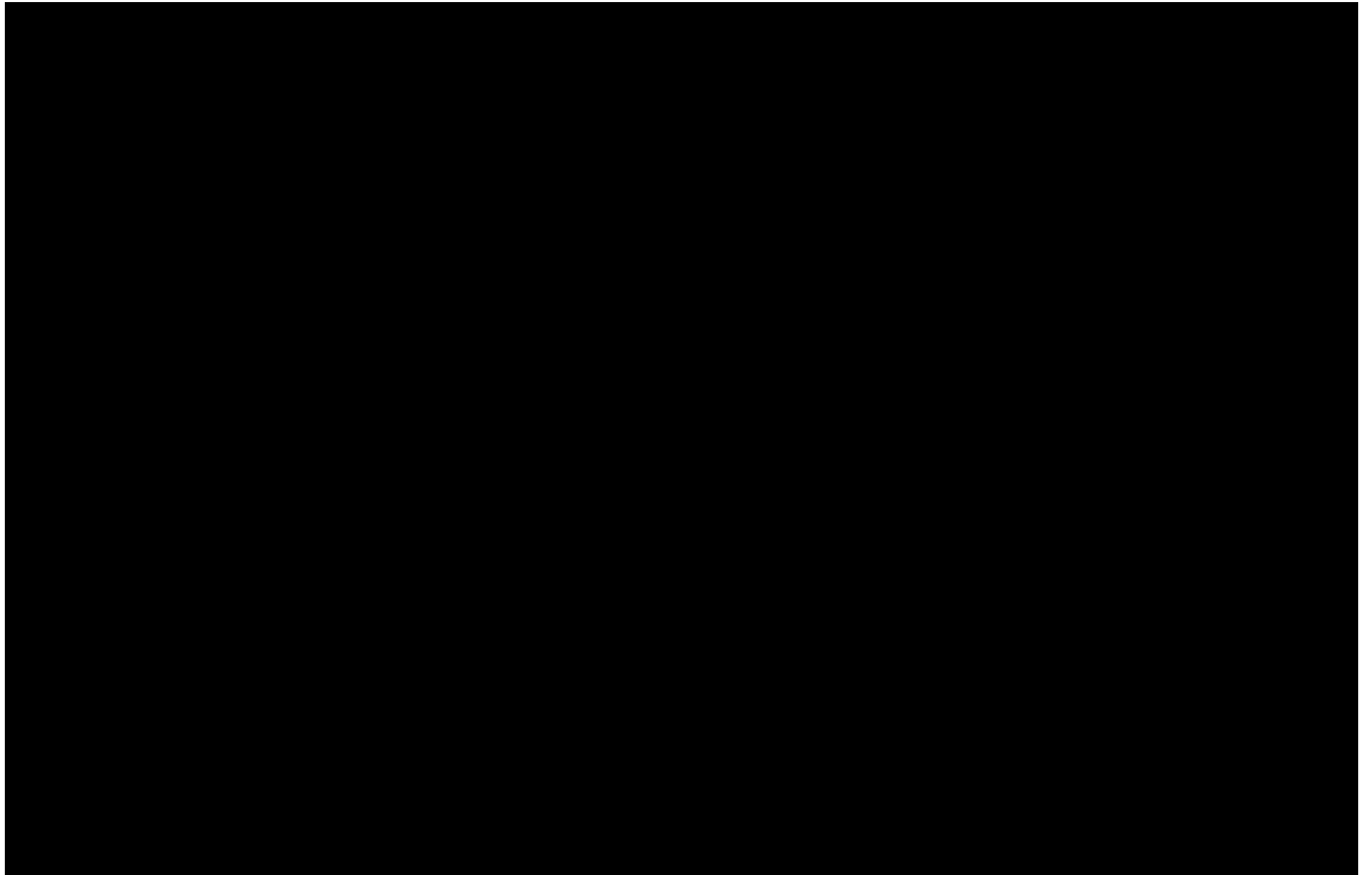
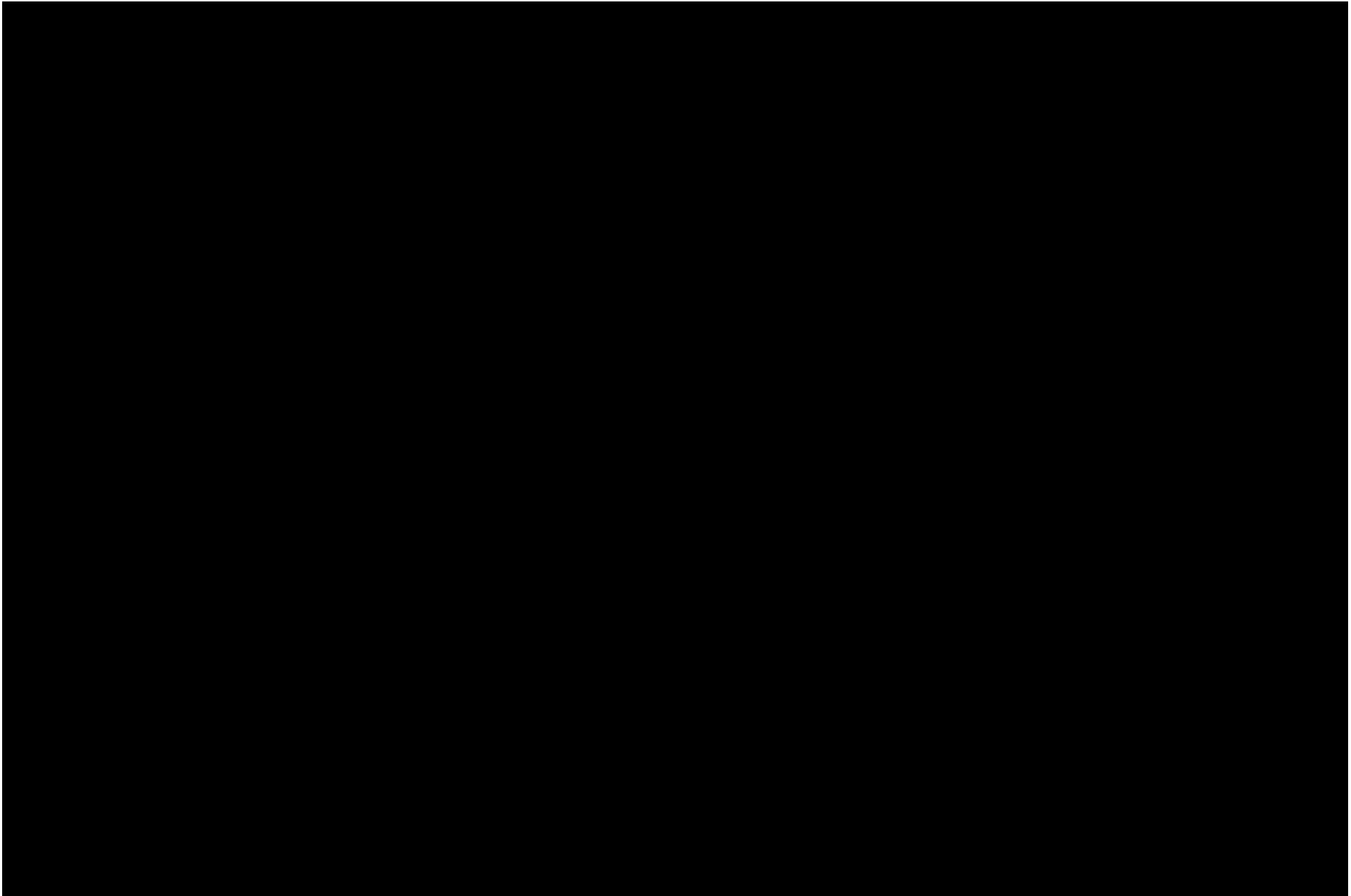


Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)



**Table D.7: Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)**

Sources & Notes:

[1]: Rosen Report I, Schedule 7, [REDACTED] C-1342, p.17.

[REDACTED]. See SCMA Report I.

[2]: U.S. CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen Report I.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from 2007, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from 2008.

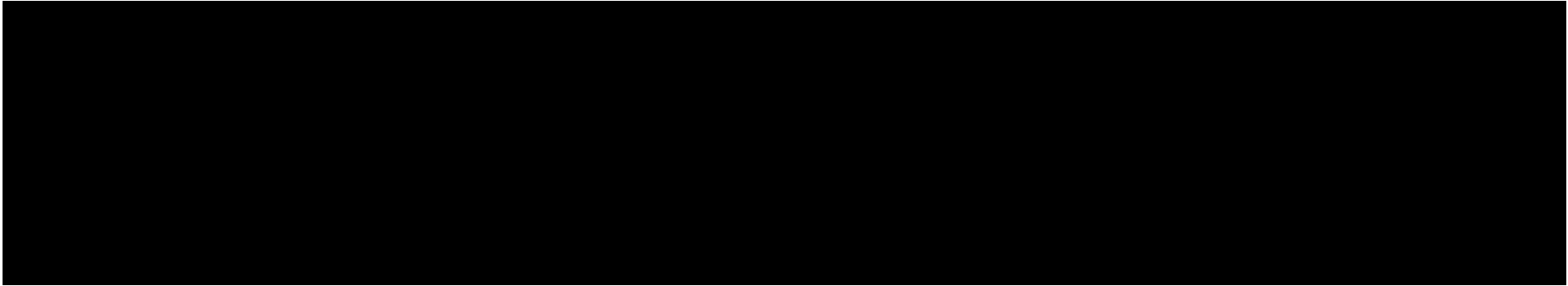
[5]: Production Factor. See SCMA Rejoinder Report and SCMA Report I.

[6]: [1] x [4].

[7]: [5] x 2% of [6] in Years 1 to 2; [5] x 3% of [6] in Years 3 to 6, and [5] x 4% of [6] in Year 7 onward.

[8]: The sum of [7].

**Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



Sources & Notes:

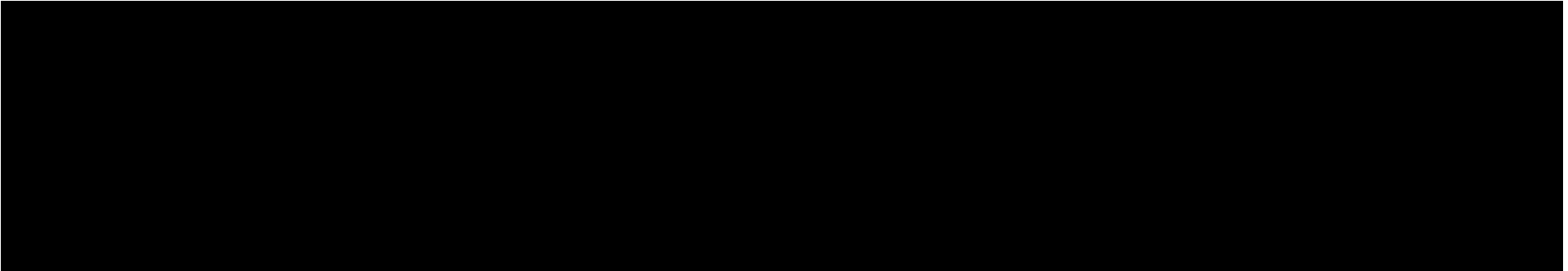
[1]: Table D.5.

[2]: See Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



Sources & Notes:

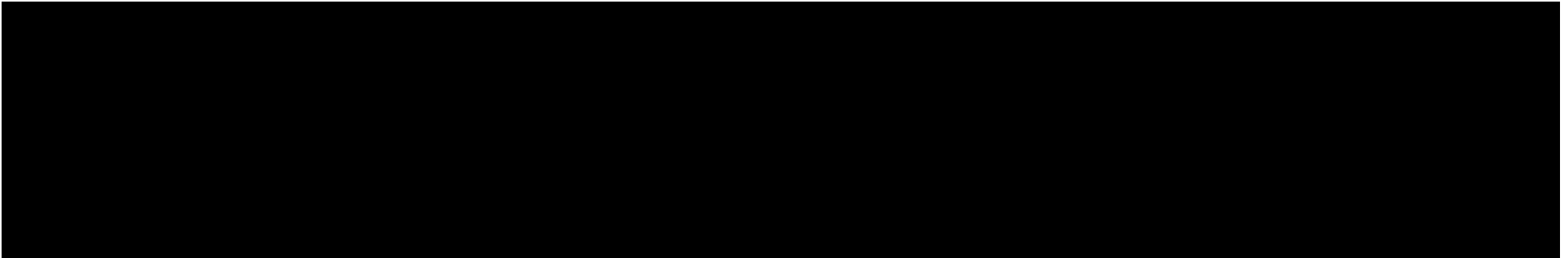
[1]: Table D.5.

[2]: See Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



Sources & Notes:

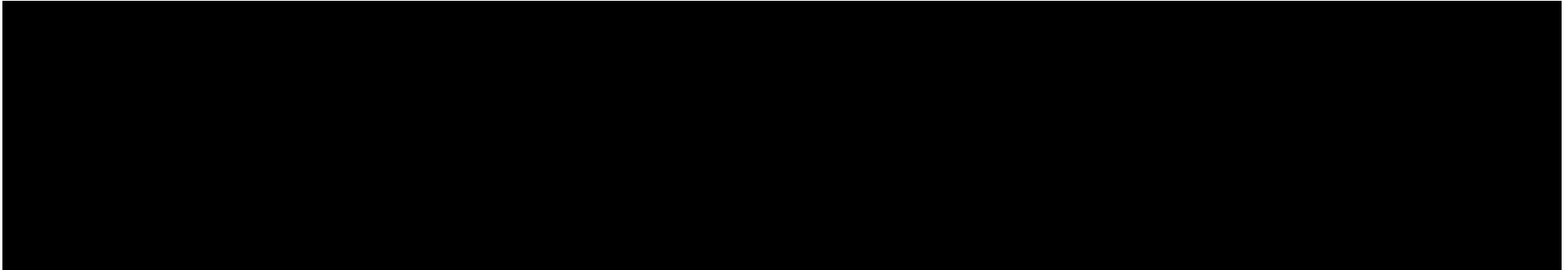
[1]: Table D.5.

[2]: See Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



Sources & Notes:

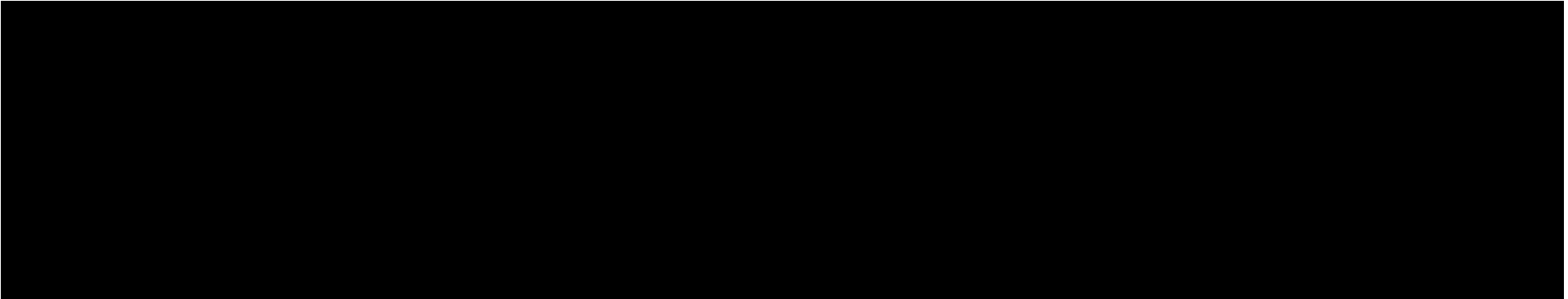
[1]: Table D.5.

[2]: See Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



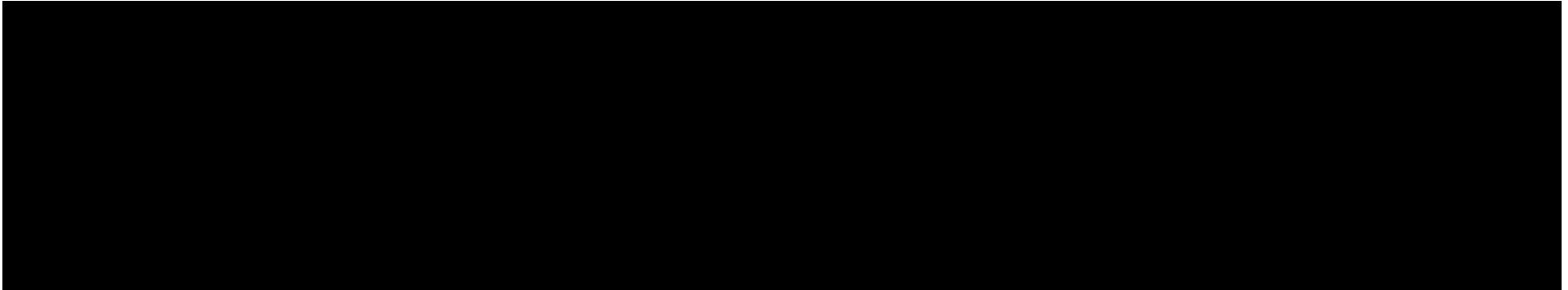
[1]: Table D.5.

[2]: See Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



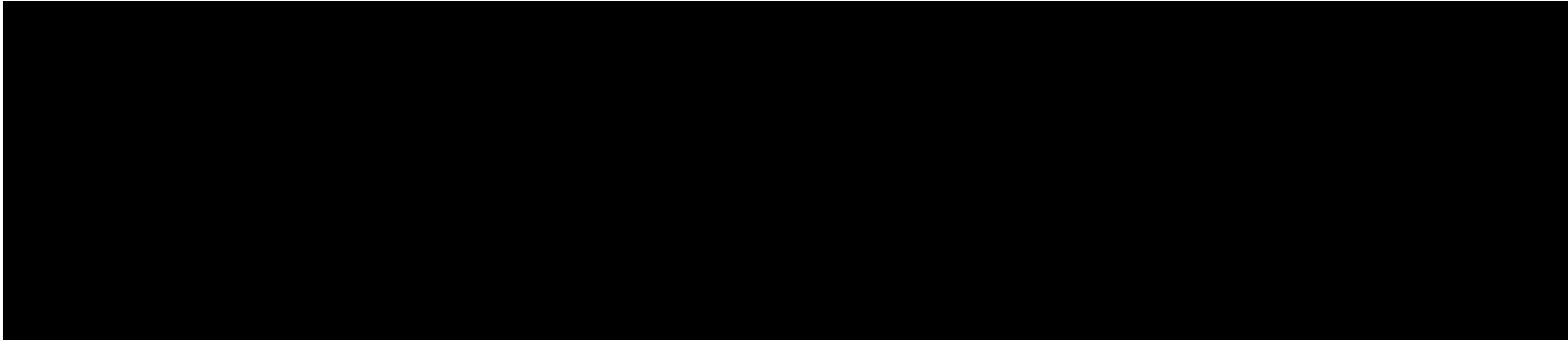
[1]: Table D.5.

[2]: See Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table D.8: Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



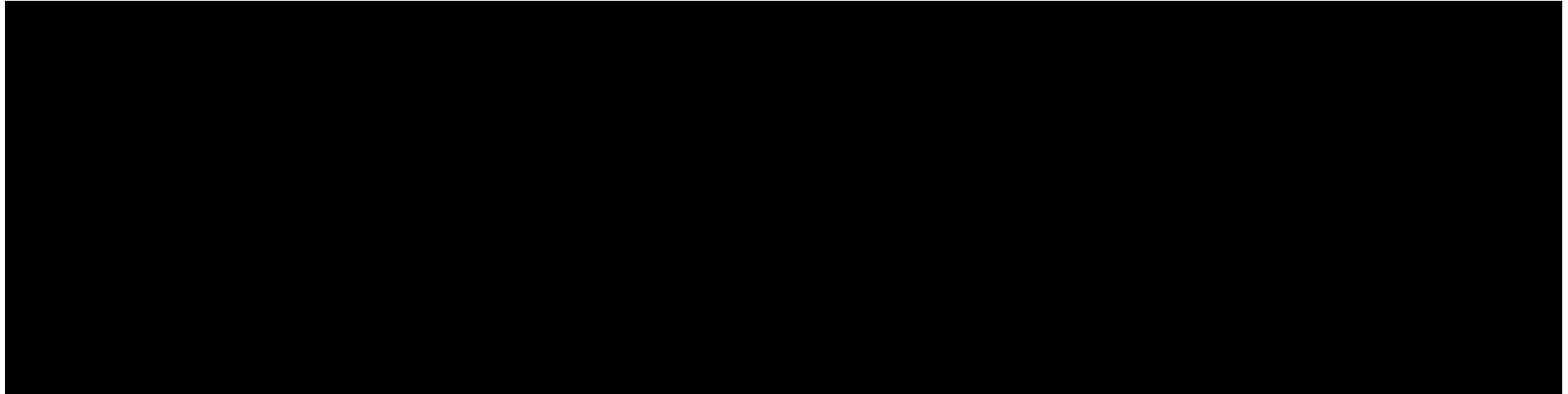
[1]: Table D.5.

[2]: See Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**



Sources & Notes:

[1]: Rosen Report I, Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen Report I. There is no basis for Mr. Rosen's assumption.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from 2007, multiplied by $1 / (1 + [2])^1$ using [2] from 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from 2009.

[5]: Table D.15.

[6]: $[1] / [5] \times [4]$.

**Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**

Sources & Notes:

[1]: Rosen Report I, Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen Report I. There is no basis for Mr. Rosen's assumption.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from 2007, multiplied by $1 / (1 + [2])^1$ using [2] from 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from 2009.

[5]: Table D.15.

[6]: $[1] / [5] \times [4]$.

**Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**

Sources & Notes:

[1]: Rosen Report I, Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen Report I. There is no basis for Mr. Rosen's assumption.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from 2007, multiplied by $1 / (1 + [2])^1$ using [2] from 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from 2009.

[5]: Table D.15.

[6]: $[1] / [5] \times [4]$.

**Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**

[1]: Rosen Report I, Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen Report I. There is no basis for Mr. Rosen's assumption.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from 2007, multiplied by $1 / (1 + [2])^1$ using [2] from 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from 2009.

[5]: Table D.15.

[6]: $[1] / [5] \times [4]$.

**Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**

Sources & Notes:

[1]: Rosen Report I, Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen Report I. There is no basis for Mr. Rosen's assumption.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from 2007, multiplied by $1 / (1 + [2])^1$ using [2] from 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from 2009.

[5]: Table D.15.

[6]: $[1] / [5] \times [4]$.

**Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**

Sources & Notes:

[1]: Rosen Report I, Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

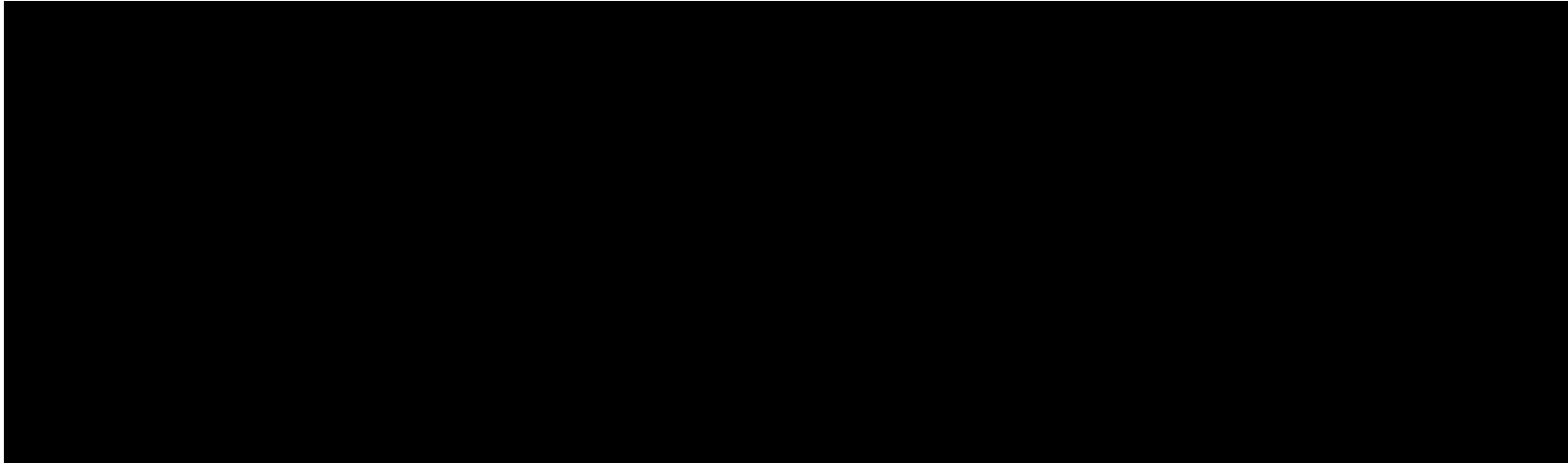
[3]: Nominal year in which values were reported in Rosen Report I. There is no basis for Mr. Rosen's assumption.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from 2007, multiplied by $1 / (1 + [2])^1$ using [2] from 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from 2009.

[5]: Table D.15.

[6]: $[1] / [5] \times [4]$.

**Table D.9: Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**



Sources & Notes:

[1]: Rosen Report I, Schedule 9. Adjusted for end of project life.

[2]: Canadian CPI, Bloomberg.

[3]: Nominal year in which values were reported in Rosen Report I. There is no basis for Mr. Rosen's assumption.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from 2007, multiplied by $1 / (1 + [2])^1$ using [2] from 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from 2009.

[5]: Table D.15.

[6]: $[1] / [5] \times [4]$.

**Table D.10: Brattle Schedule 10
Interest Expense**

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Interest expense									
Existing debt	-	-	-	-	-	-	-	-	-
New debt	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-

Sources & Notes:

Interest expense is set to zero.

Table D.11: Brattle Schedule 11
Income Taxes
(US\$ 2007)

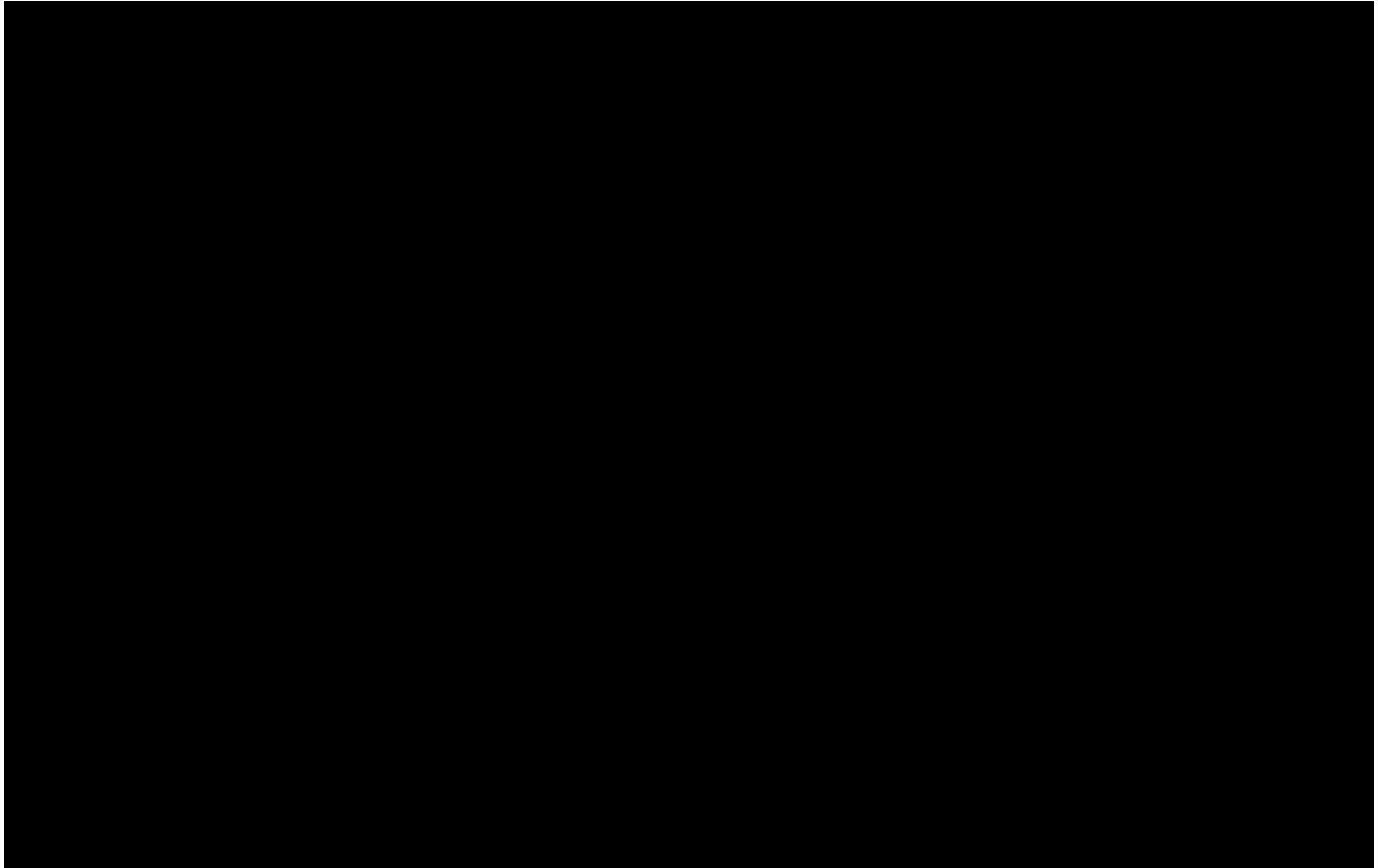


Table D.11: Brattle Schedule 11
Income Taxes
(US\$ 2007)

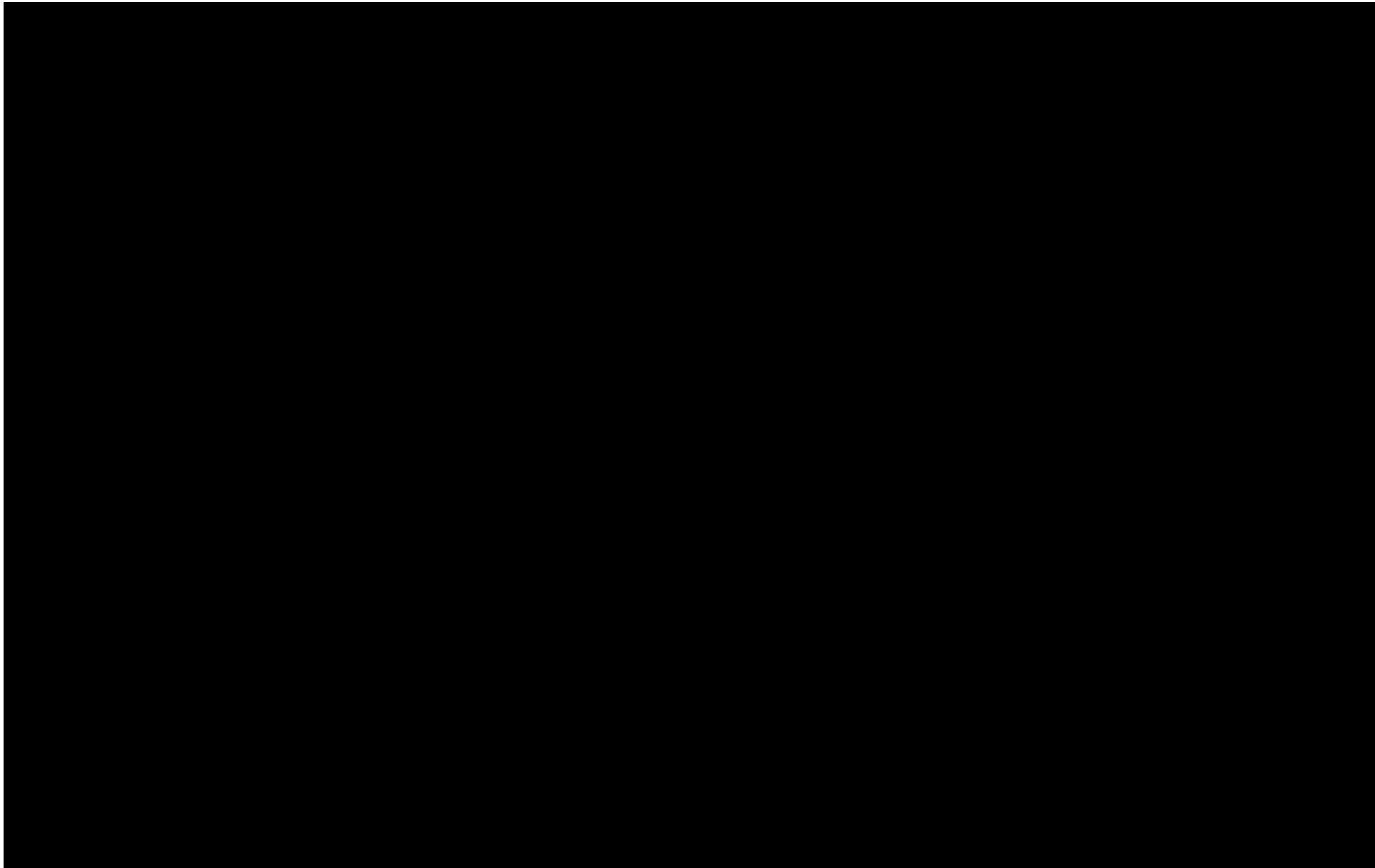


Table D.11: Brattle Schedule 11
Income Taxes
(US\$ 2007)

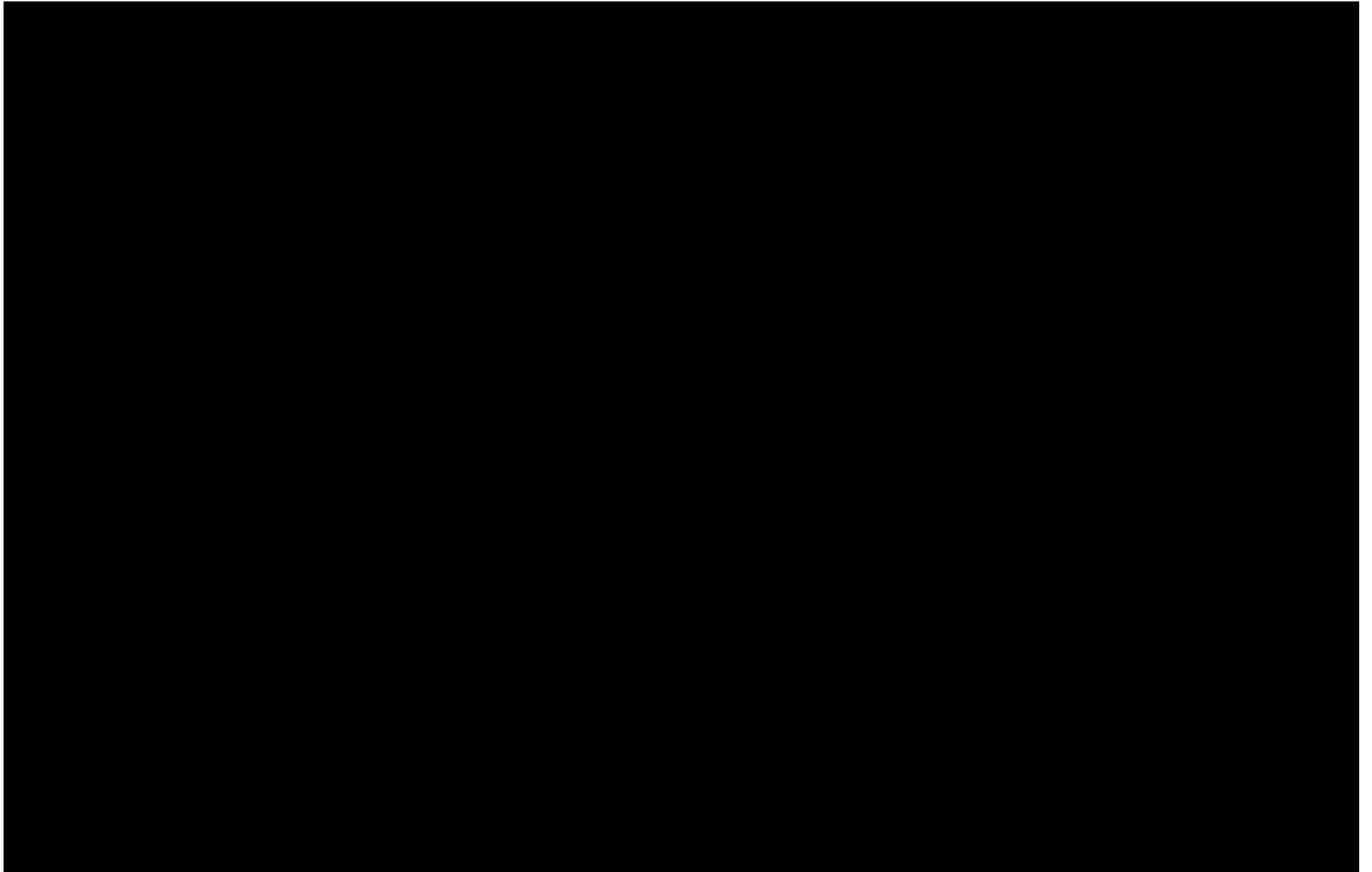


Table D.11: Brattle Schedule 11
Income Taxes
(US\$ 2007)

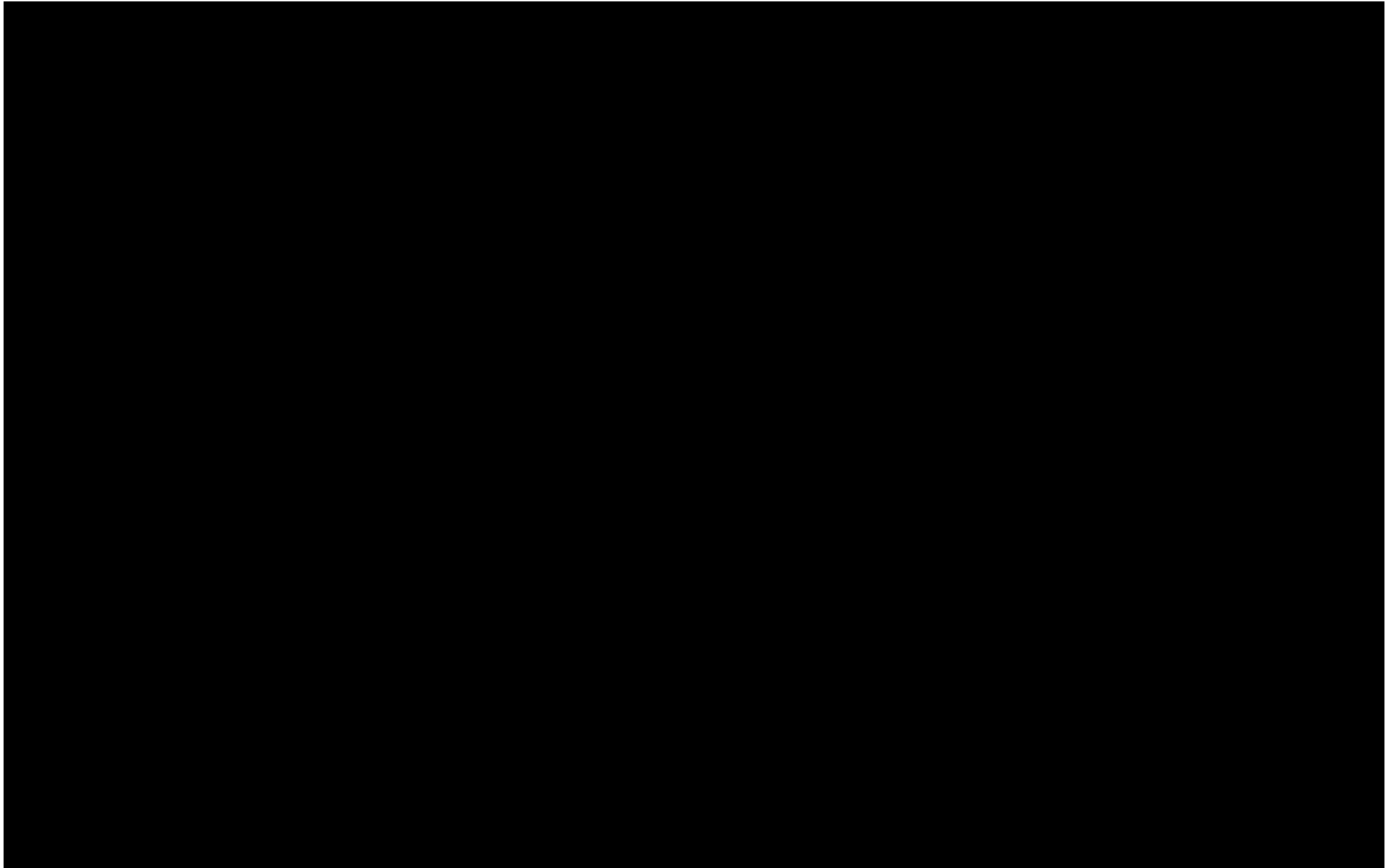


Table D.11: Brattle Schedule 11
Income Taxes
(US\$ 2007)

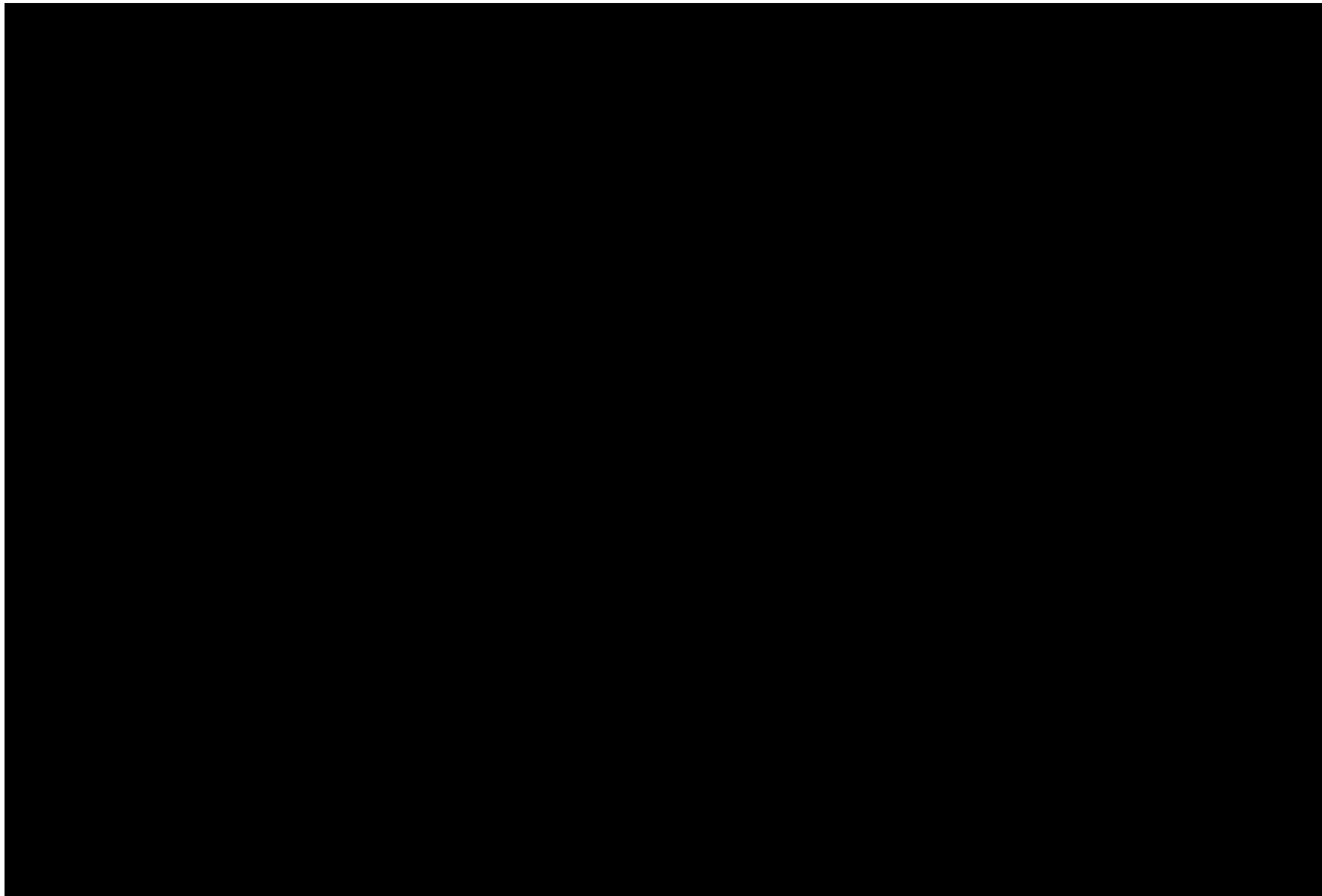


Table D.11: Brattle Schedule 11
Income Taxes
(US\$ 2007)

Sources & Notes:

Tax calculations are adopted from Rosen Report I, Schedule 11.

Capital tax is converted to US\$ using Table D.15.

[1]: Table D.1.

[2]: Table D.1.

[3]: [1] + [2].

[4]: Cumulative of [3].

[5]: 35.5% in 2008; 35% in 2009; 34% in 2010; 32.5% in 2011; and, 31% in 2012 - 2016.

PwC. Tax Facts and Figures 2008.

Deloitte. Corporate Income Tax Rates (2009 - 2013).

Deloitte. Corporate Income Tax Rates (2012 - 2016).

[6]: Negative [11].

[7]: Rosen Report I, Schedule 11.

[8]: The sum of [5] through [7].

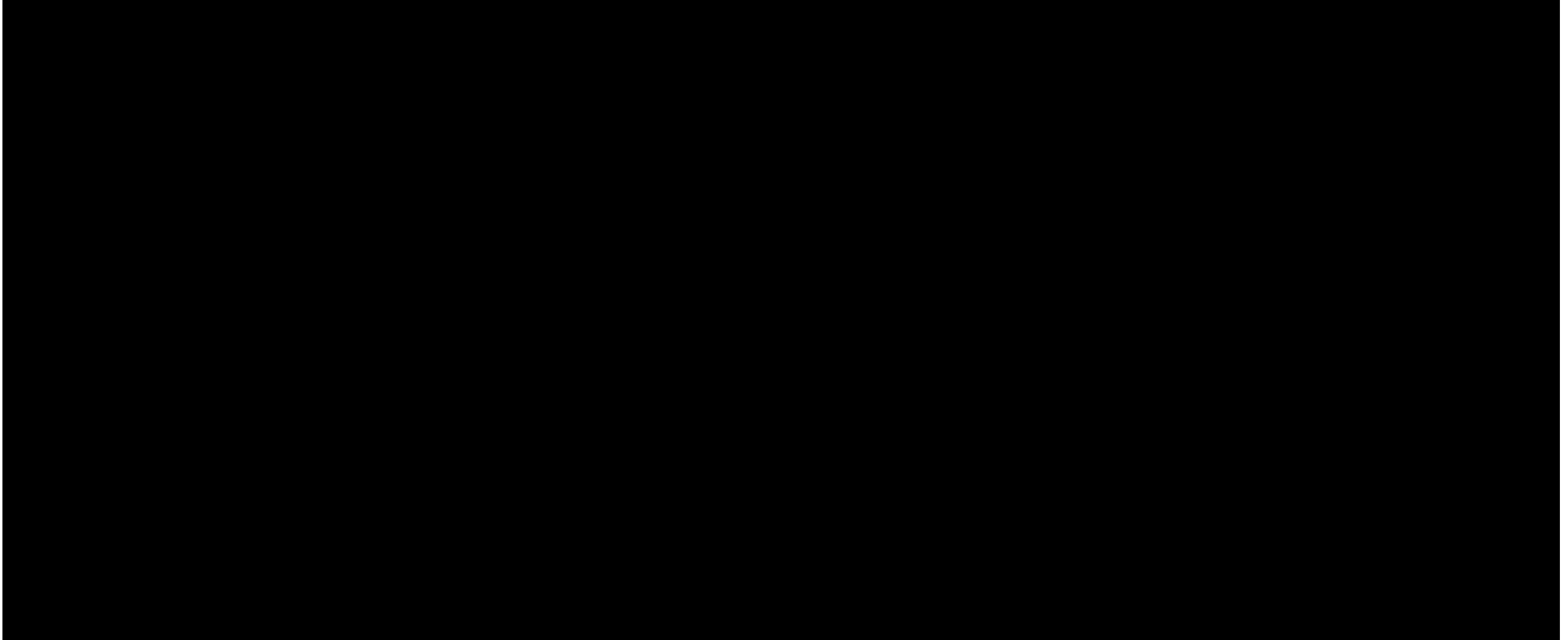
[9]: Taken from Table D.5.

[10]: Reclassified as CCA Class 14.1 beginning 1 January 2007.

Subject to CCA rate of 7% for the first 10 years and 5% thereafter.

Source: Grant Thornton. New rules for eligible capital property.

**Table D.12: Brattle Schedule 12
Changes in Working Capital
(US\$ 2007)**



[2]: Table D.1.

[3]: The sum of [2].

[4]: Days in each year. See Rosen Report I, Schedule 12.

[5]: $[1] / [4] \times 30$.

[6]: $[3] / [4] \times 30$.

[7]: The sum of [5] and [6].

[8]: [7] from the current year, less [7]
from the previous year.

**Table D.12: Brattle Schedule 12
Changes in Working Capital**

[1]: Table D.1.

[2]: Table D.1.

[3]: The sum of [2].

[4]: Days in each year. See Rosen Report I, Schedule 12

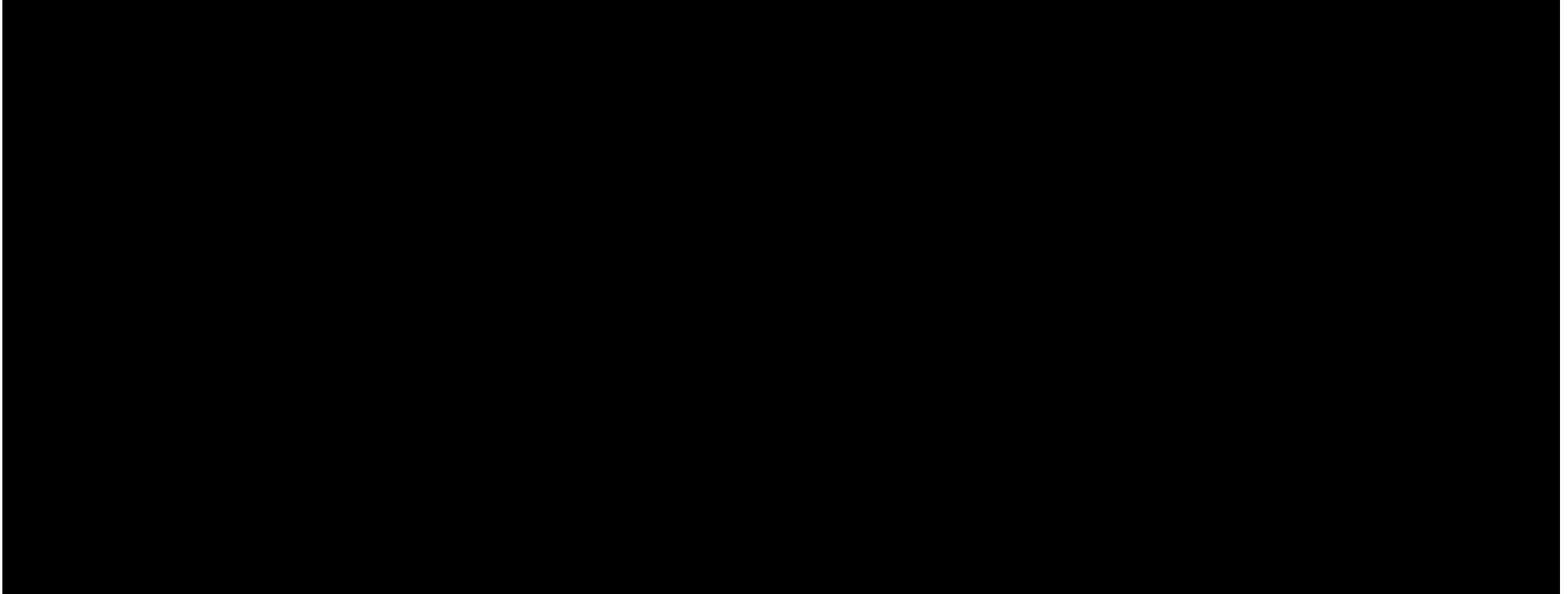
[5]: $[1] / [4] \times 30$.

[6]: $[3] / [4] \times 30$.

[7]: The sum of [5] and [6].

[8]: [7] from the current year, less [7]
from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US\$ 2007)



[1]: Table D.1.

[2]: Table D.1.

[3]: The sum of [2].

[4]: Days in each year. See Rosen Report I, Schedule 12

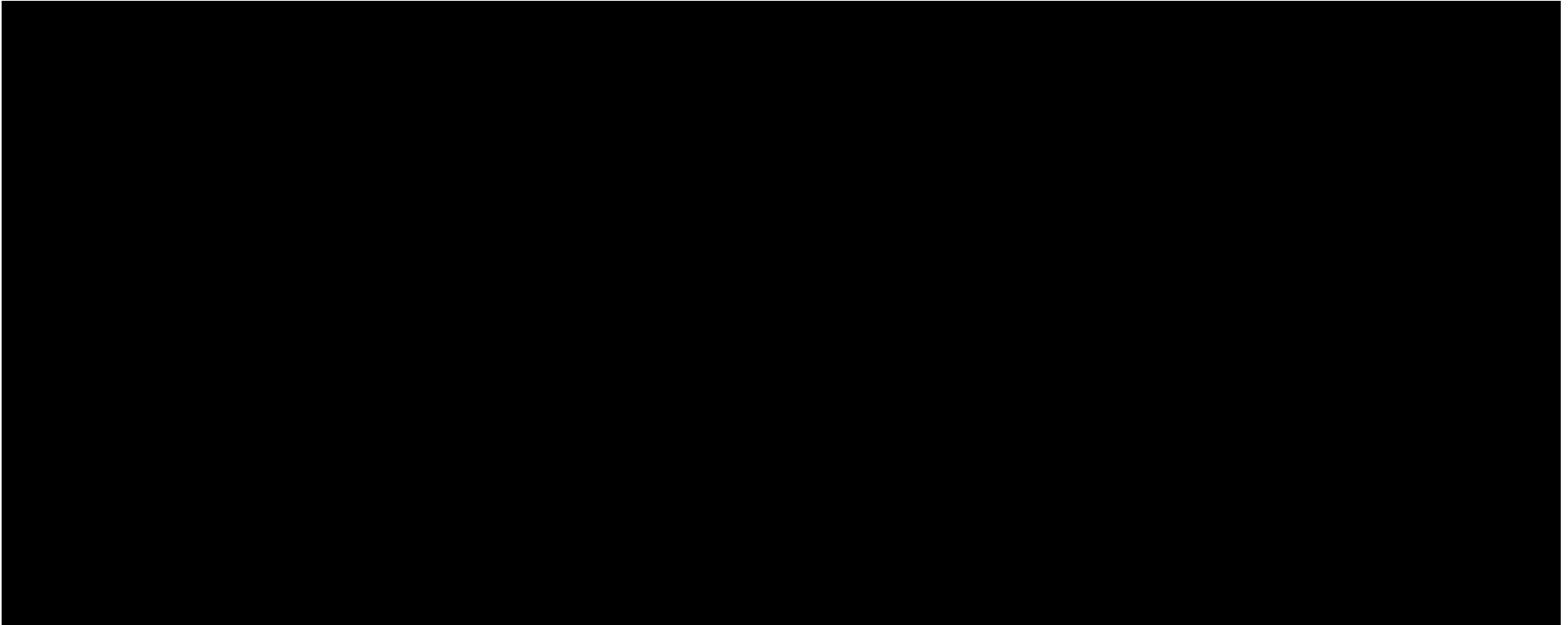
[5]: $[1] / [4] \times 30$.

[6]: $[3] / [4] \times 30$.

[7]: The sum of [5] and [6].

[8]: [7] from the current year, less [7]
from the previous year.

**Table D.12: Brattle Schedule 12
Changes in Working Capital
(US\$ 2007)**



[1]: Table D.1.

[2]: Table D.1.

[3]: The sum of [2].

[4]: Days in each year. See Rosen Report I, Schedule 12

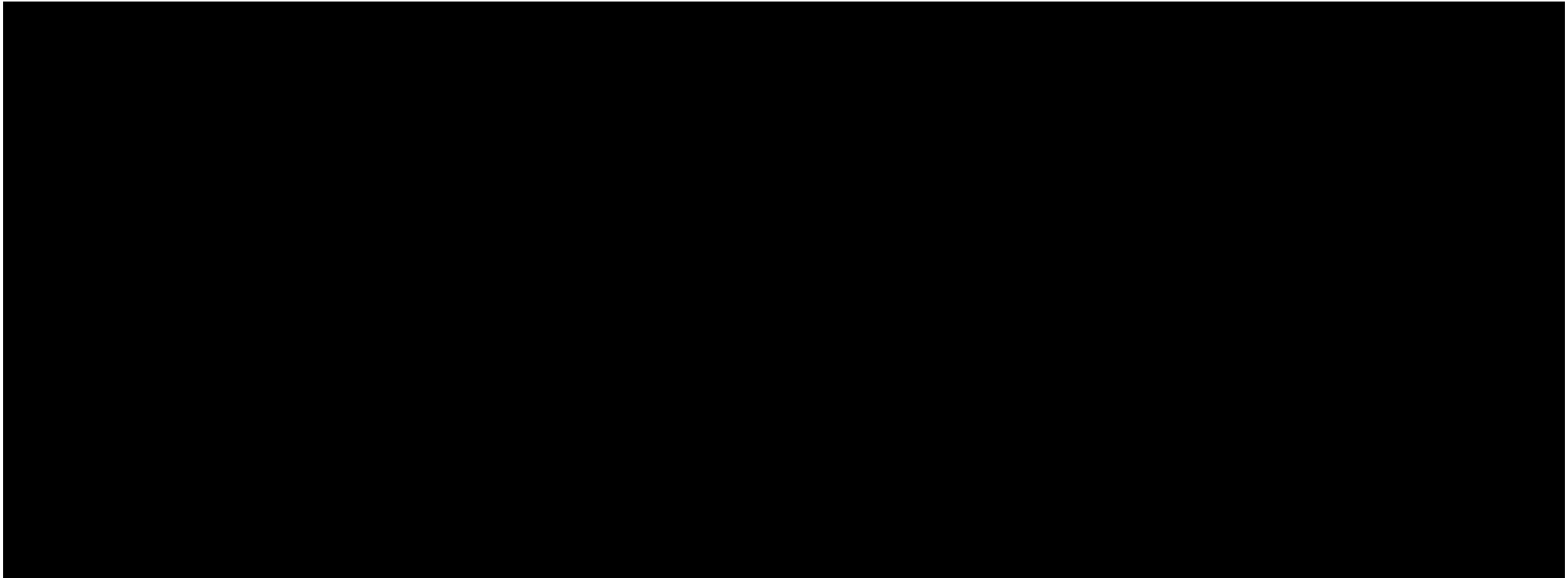
[5]: $[1] / [4] \times 30$.

[6]: $[3] / [4] \times 30$.

[7]: The sum of [5] and [6].

[8]: [7] from the current year, less [7]
from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US\$ 2007)



[1]: Table D.1.

[2]: Table D.1.

[3]: The sum of [2].

[4]: Days in each year. See Rosen Report I, Schedule 12

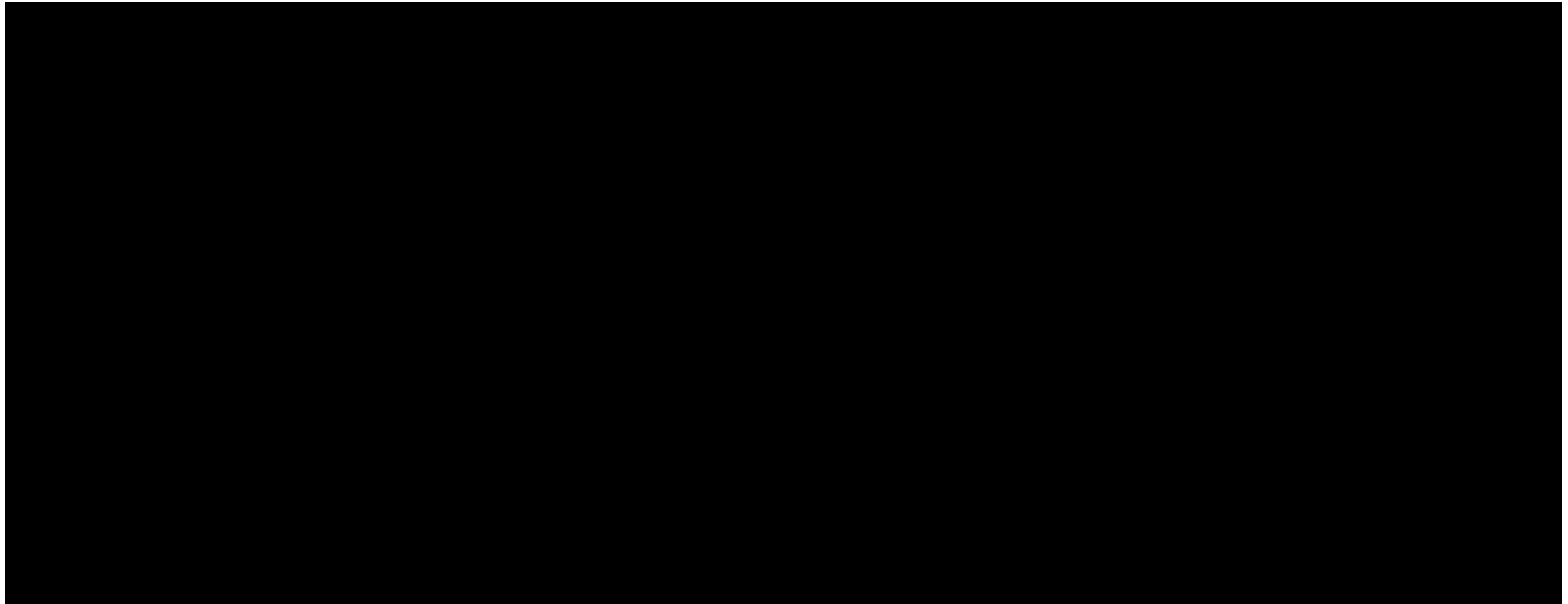
[5]: $[1] / [4] \times 30$.

[6]: $[3] / [4] \times 30$.

[7]: The sum of [5] and [6].

[8]: [7] from the current year, less [7]
from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US\$ 2007)



[1]: Table D.1.

[2]: Table D.1.

[3]: The sum of [2].

[4]: Days in each year. See Rosen Report I, Schedule 12

[5]: $[1] / [4] \times 30$.

[6]: $[3] / [4] \times 30$.

[7]: The sum of [5] and [6].

[8]: [7] from the current year, less [7]
from the previous year.

Table D.12: Brattle Schedule 12
Changes in Working Capital
(US\$ 2007)

Sources & Notes:

[1]: Table D.1.

[2]: Table D.1.

[3]: The sum of [2].

[4]: Days in each year. See Rosen Report I, Schedule 12

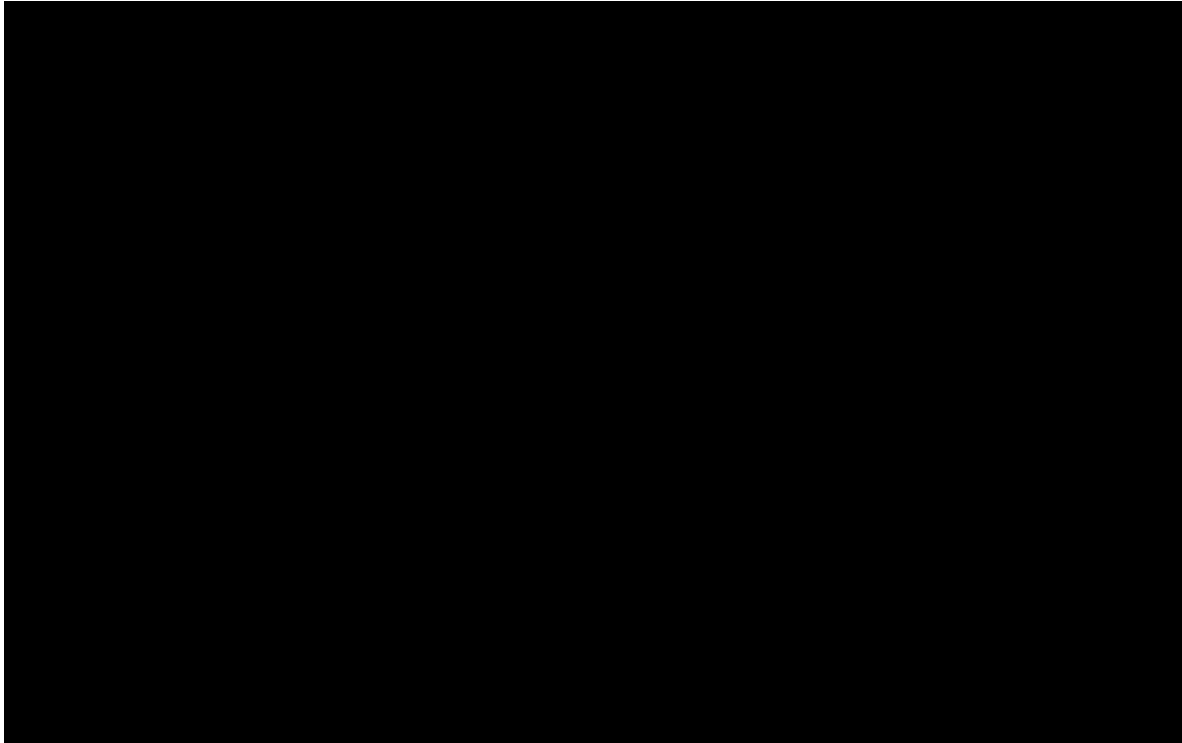
[5]: $[1] / [4] \times 30$.

[6]: $[3] / [4] \times 30$.

[7]: The sum of [5] and [6].

[8]: [7] from the current year, less [7]
from the previous year.

**Table D.12: Brattle Schedule 12
Changes in Working Capital
(US\$ 2007)**



Sources & Notes:

[1]: Table D.1.

[2]: Table D.1.

[3]: The sum of [2].

[4]: Days in each year. See Rosen Report I, Schedule 12

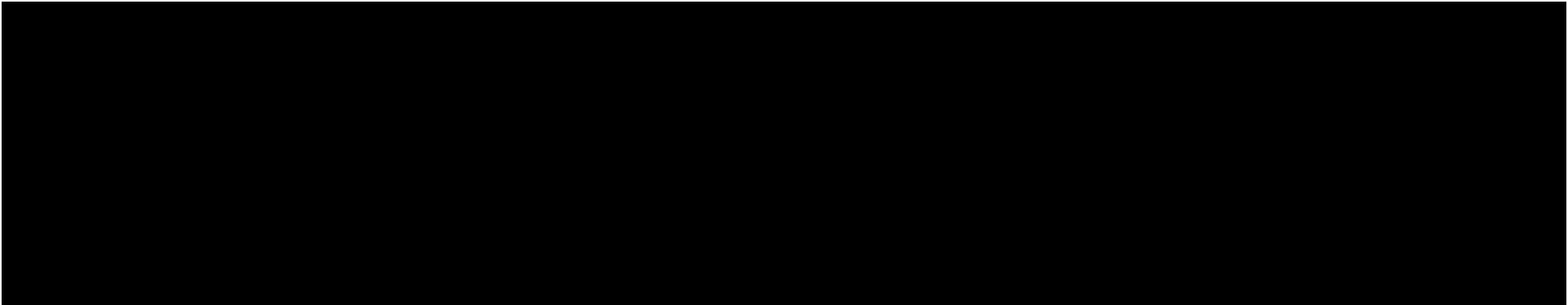
[5]: $[1] / [4] \times 30$.

[6]: $[3] / [4] \times 30$.

[7]: The sum of [5] and [6].

[8]: [7] from the current year, less [7]
from the previous year.

Table D.13: SCMA CIF Prices (2007 US\$)



Sources & Notes:

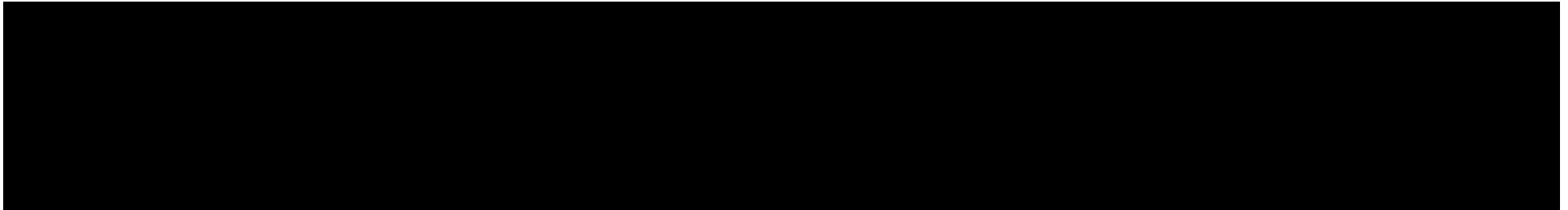
[1]: U.S. CPI, Bloomberg.

[2]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through the current year, where n is 0.19 for 2007, n is 0.5 for the current year, and 1 for all years in-between.
Years after 2016 are set to 2016 values.

[3]: SCMA Report I.

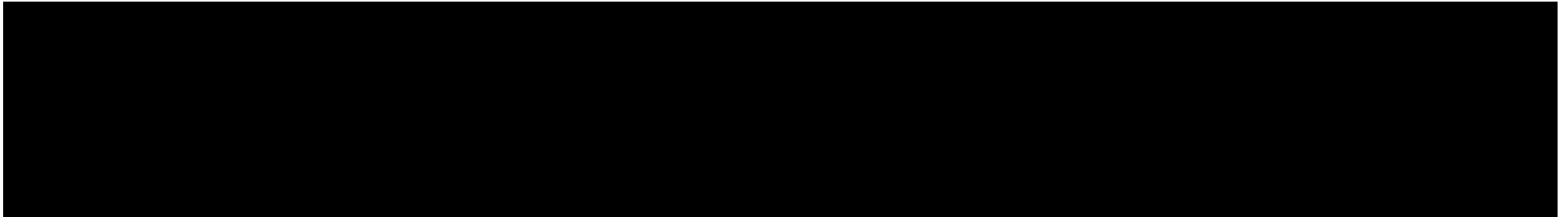
[4]: [2] x [3] for each specified location.

**Table D.14: Freight Costs
2007 (USD/Tonne)**



Source: Marsoft Rejoinder Report.
Note: Figures are deflated to 2007 values
using Marsoft's inflation rate of 2.3%.

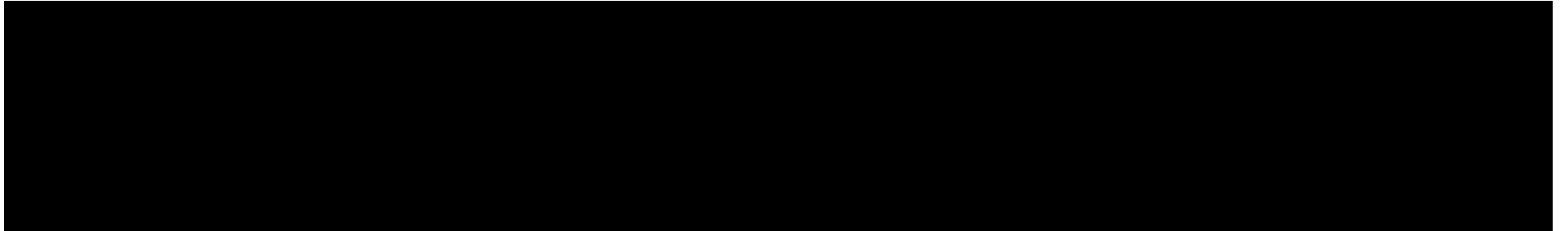
**Table D.14: Freight Costs
2007 (USD/Tonne)**



Source: Marsoft Rejoinder Report.

Note: Figures are deflated to 2007 values
using Marsoft's inflation rate of 2.3%.

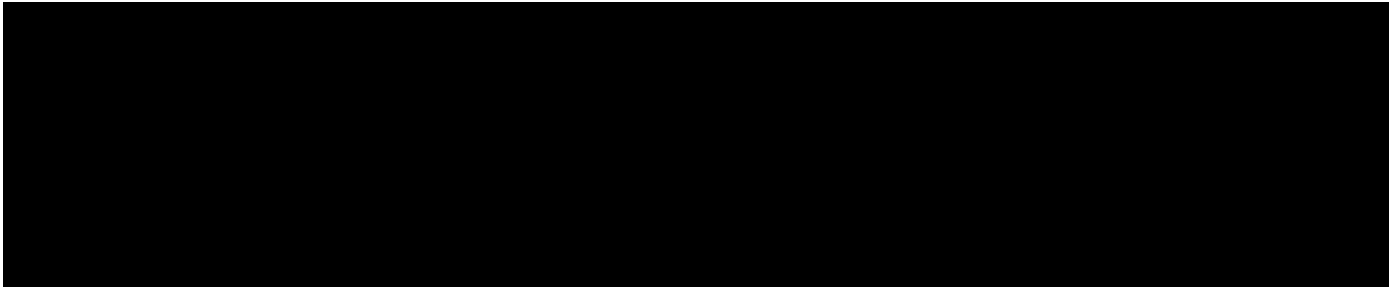
**Table D.14: Freight Costs
2007 (USD/Tonne)**



Source: Marsoft Rejoinder Report.

Note: Figures are deflated to 2007 values
using Marsoft's inflation rate of 2.3%.

**Table D.14: Freight Costs
2007 (USD/Tonne)**



Source: Marsoft Rejoinder Report.

Note: Figures are deflated to 2007 values
using Marsoft's inflation rate of 2.3%.

**Table D.15: Forward FX Rates
(October 2007)**

		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Foreign Exchange Rate (US\$ to C\$)	[1]	1.0265	1.0237	1.0234	1.0279	1.0305	1.0346	1.0388	1.0440	1.0492	1.0545	1.0578	1.0611	1.0643	1.0676	1.0708
Years from 2007	[2]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Forward Year	[3]	1Y	2Y	3Y	4Y	5Y	6Y	7Y	8Y	9Y	10Y	-	-	-	-	15Y

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates.

FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y forward rate.

**Table D.15: Forward FX Rates
(October 2007)**

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Foreign Exchange Rate (US\$ to C\$)	[1]	1.0739	1.0771	1.0802	1.0833	1.0864	1.0936	1.1009	1.1081	1.1153	1.1225	1.1284	1.1343	1.1402	1.1462	1.1521
Years from 2007	[2]	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Forward Year	[3]	-	-	-	-	20Y	-	-	-	-	25Y	-	-	-	-	30Y

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates.

FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y forward rate.

**Table D.15: Forward FX Rates
(October 2007)**

		2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Foreign Exchange Rate (US\$ to C\$)	[1]	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521
Years from 2007	[2]	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Forward Year	[3]	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates.

FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y forward rate.

**Table D.15: Forward FX Rates
(October 2007)**

		2052	2053	2054	2055	2056	2057	2058	2059
Foreign Exchange Rate (US\$ to C\$)	[1]	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521	1.1521
Years from 2007	[2]	45	46	47	48	49	50	51	52
Forward Year	[3]	30Y	30Y	30Y	30Y	30Y	30Y	30Y	30Y

Sources & Notes:

[1]: R-730, Bloomberg FX forward rates.

FX rates in years without forward rates are interpolated.

[2]: [Year] - 2007.

[3]: Years beyond 2037 are assigned the 30Y forward rate.

Appendix E: Discounted Cash Flow Analysis—Project Delay

**Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)**

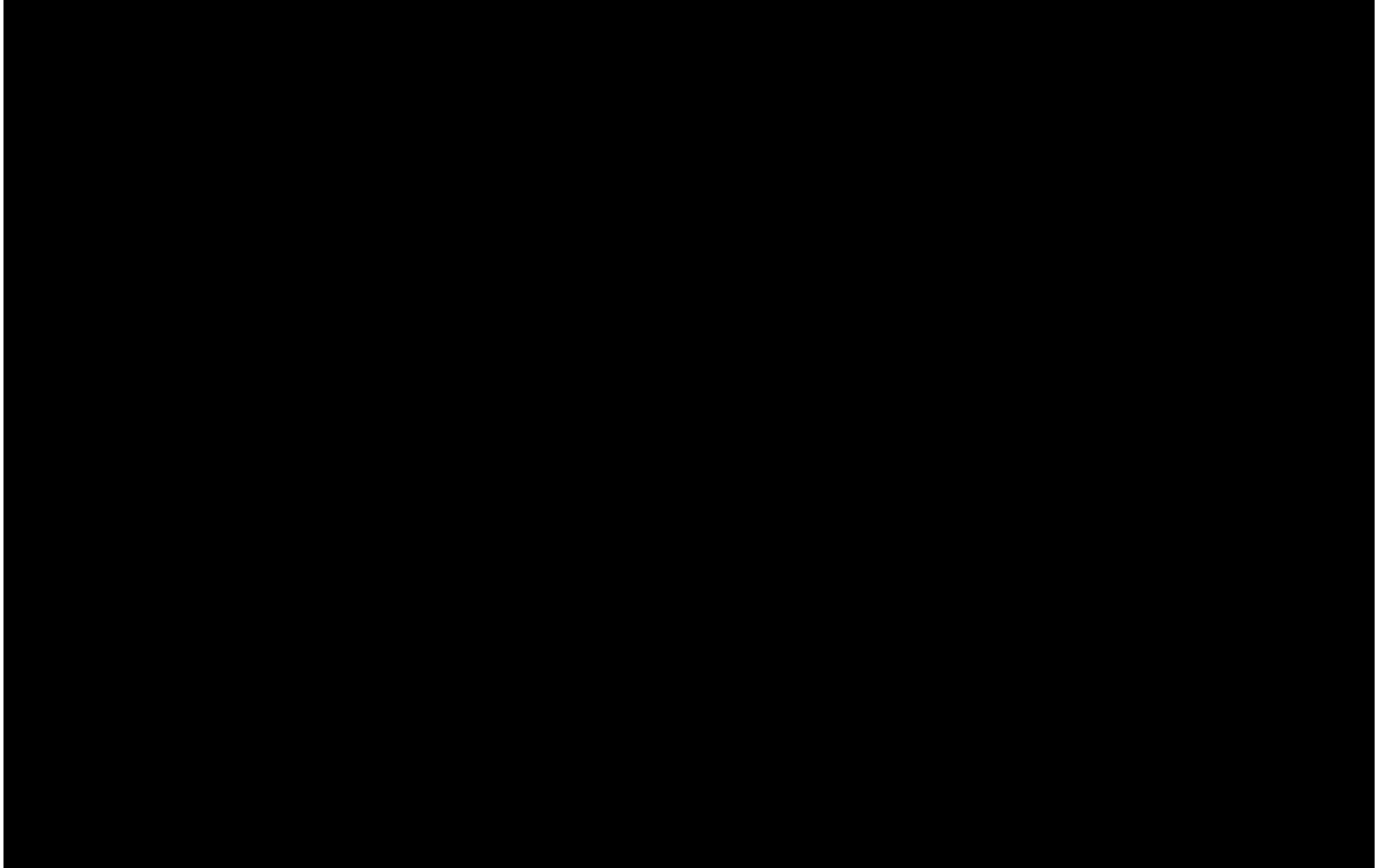


Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)

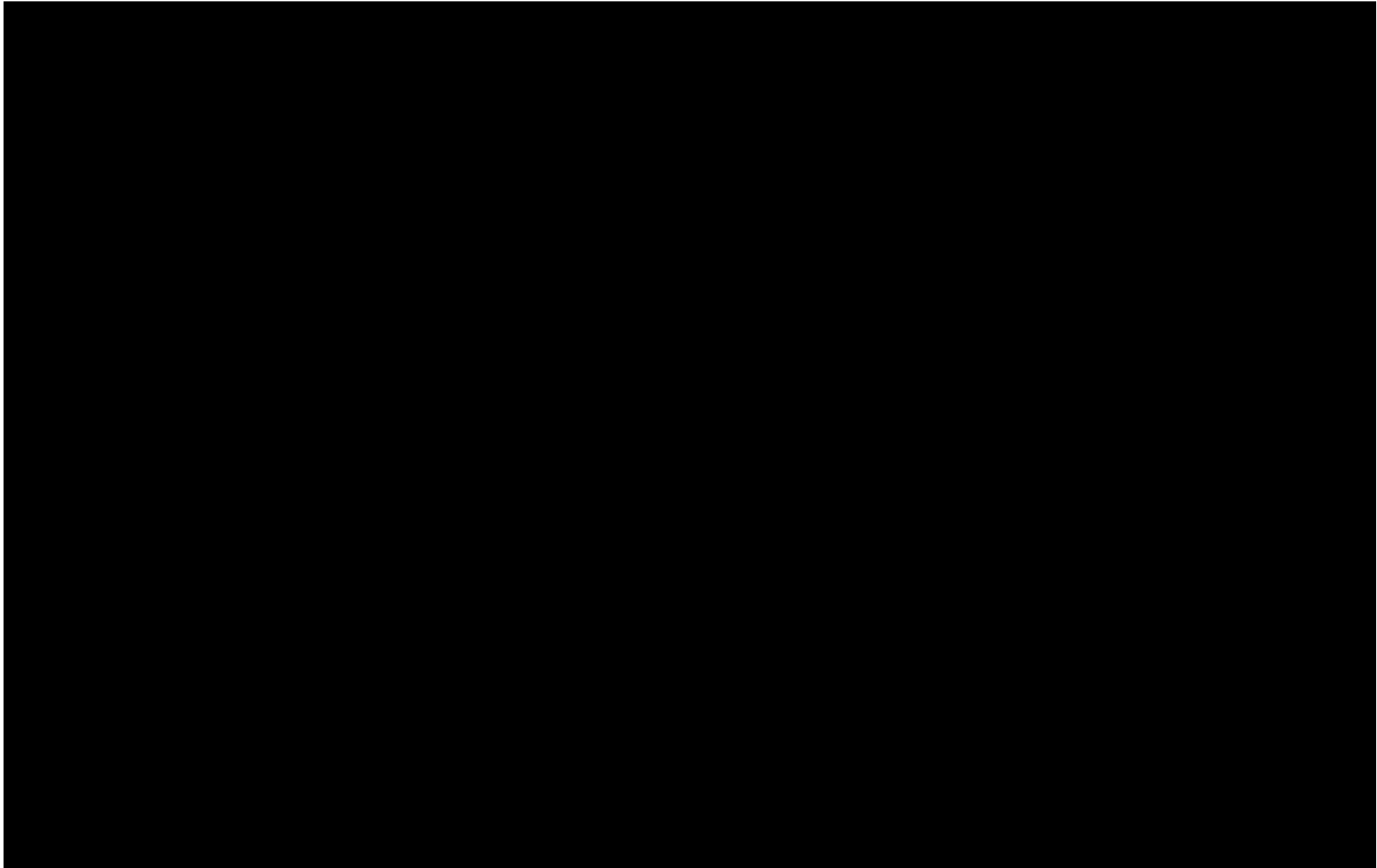


Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)

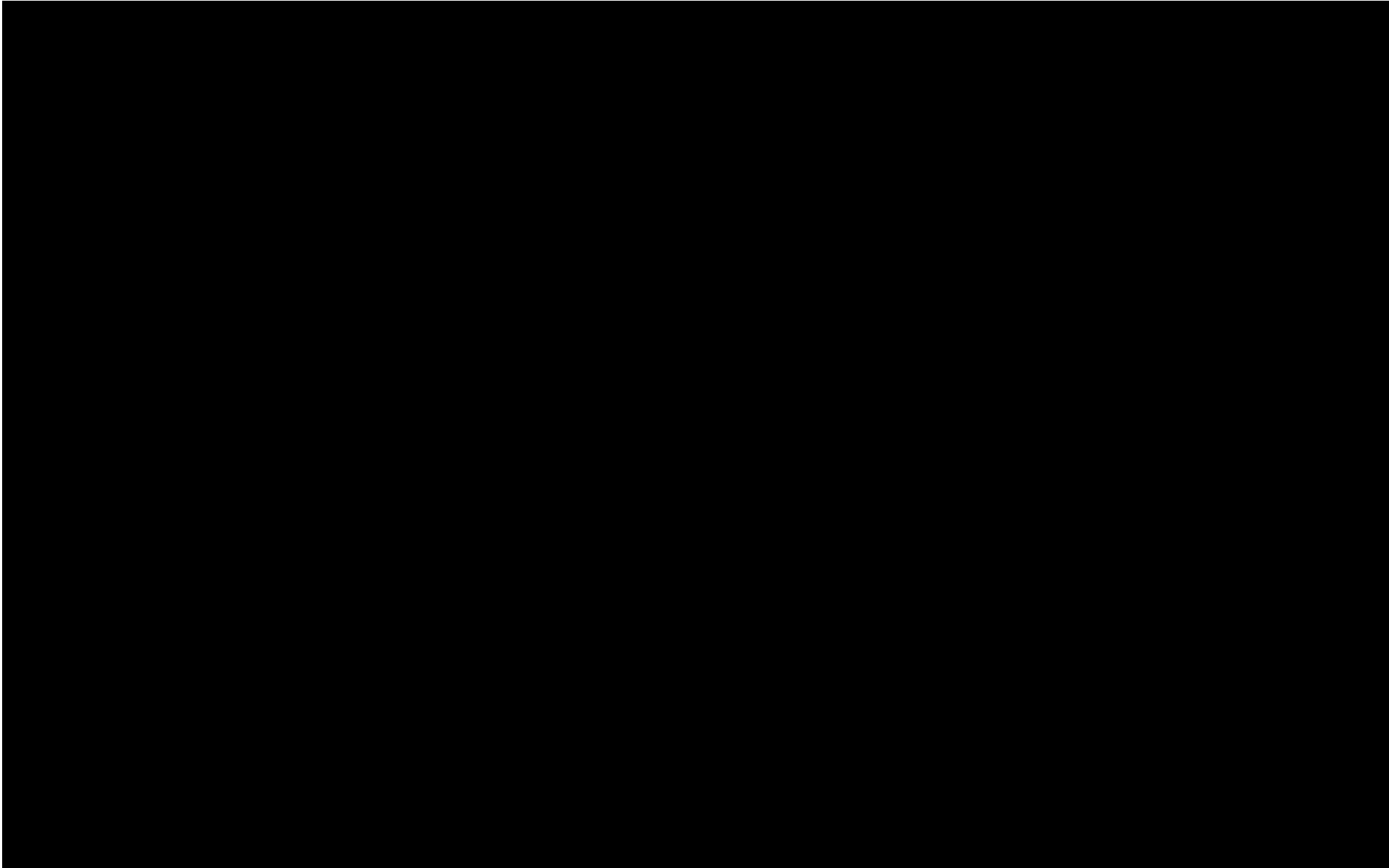


Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)

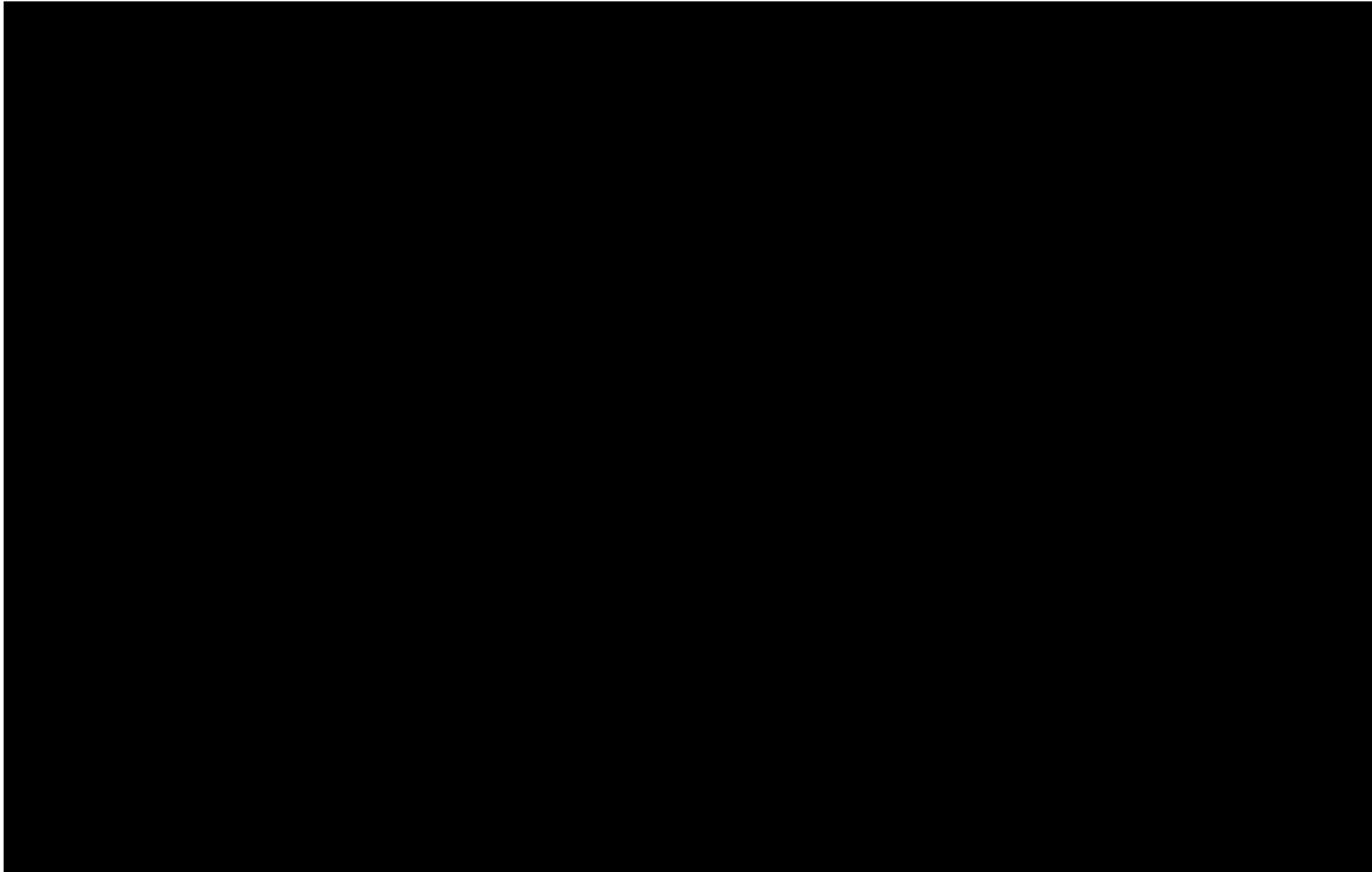


Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)

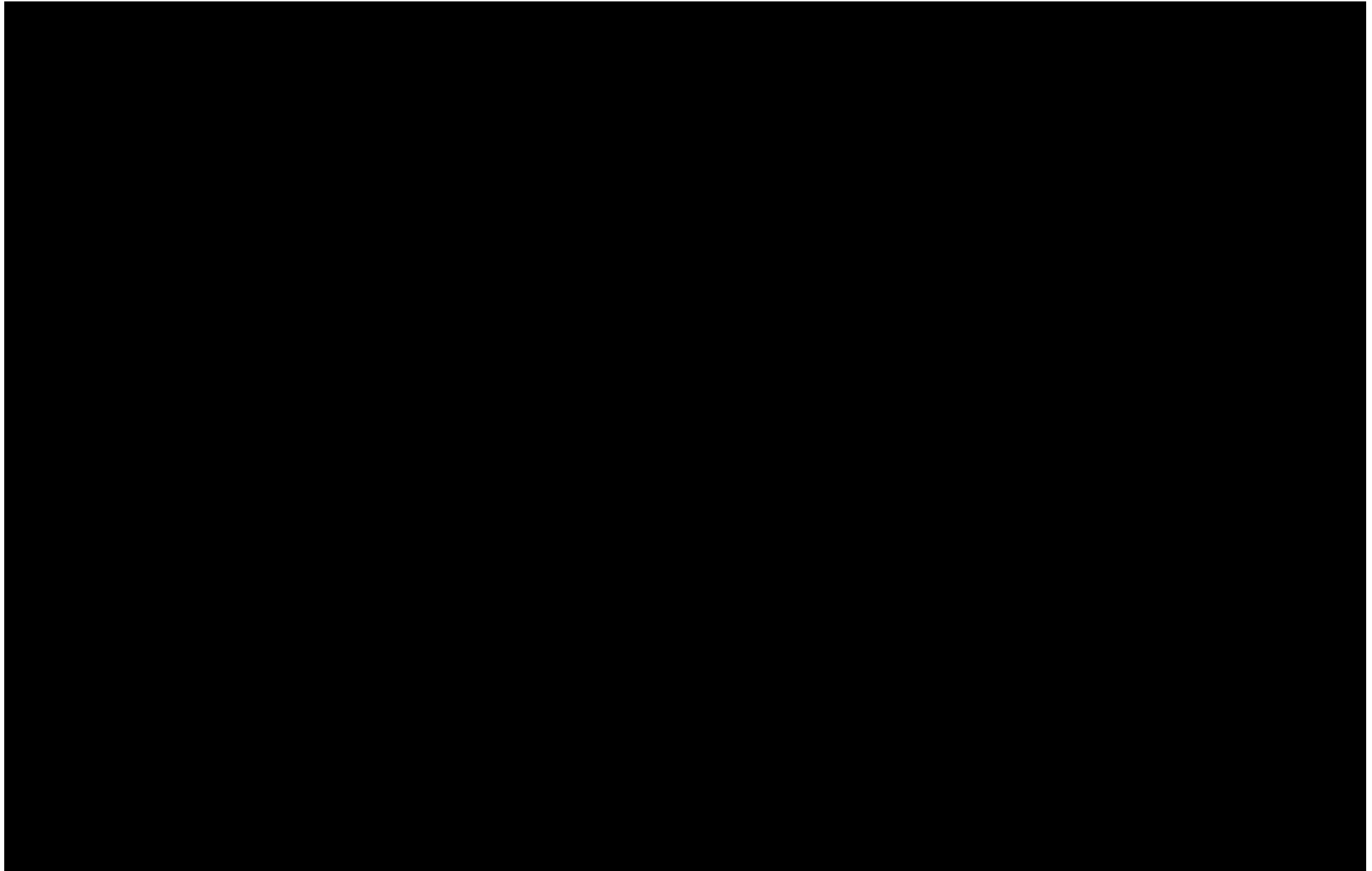
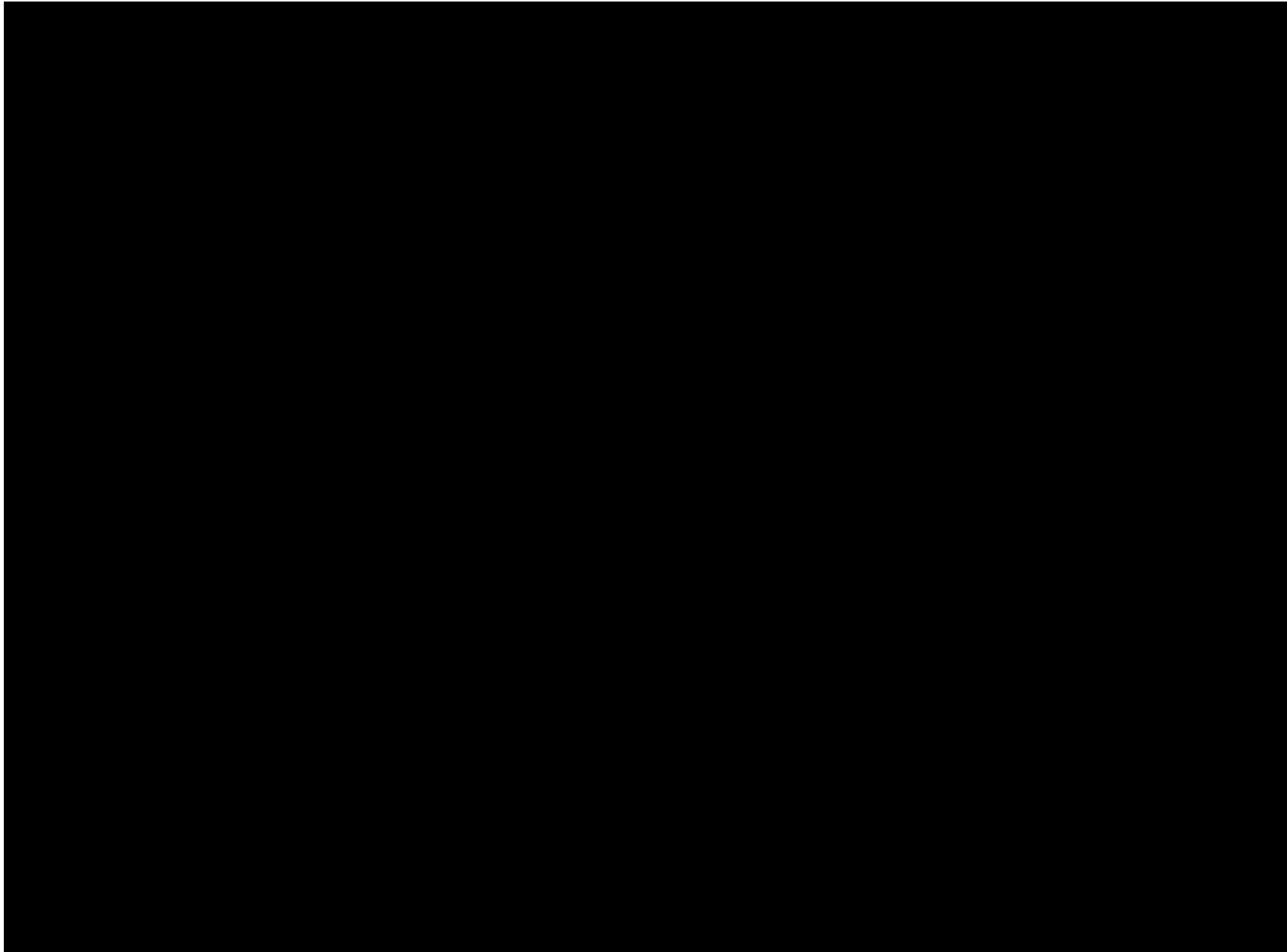


Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)



**Table E.1: Delayed Brattle Schedule 1
Discretionary Cash Flow (2007 US\$)**

Sources & Notes:

The project is delayed 4.19 years.

[1]: Chodorow Report I, Section VI.

[2]: Chodorow Report I, Appendix G.

[3]: E.2.

[5]: E.3.

[4]: E.2.

[6]: [4] x [5].

[7]: (-1) x [3] of Table E.4 x [6] of Table E.4.

[8]: Chodorow Report I, Section V.F.2.

[9]: The sum of [9] of E.6, [8] of Table E.7, and [4] of Table E.8.

[10]: The sum of [6] through [9].

[11]: 5% of [6]. See Rosen Report I, Schedule 1.

[12]: E.9.

[13]: E.10.

[14]: The sum of [10] through [13].

[15]: E.11.

[16]: E.5.

[17]: E.12.

[18]: The sum of [14] through [17].

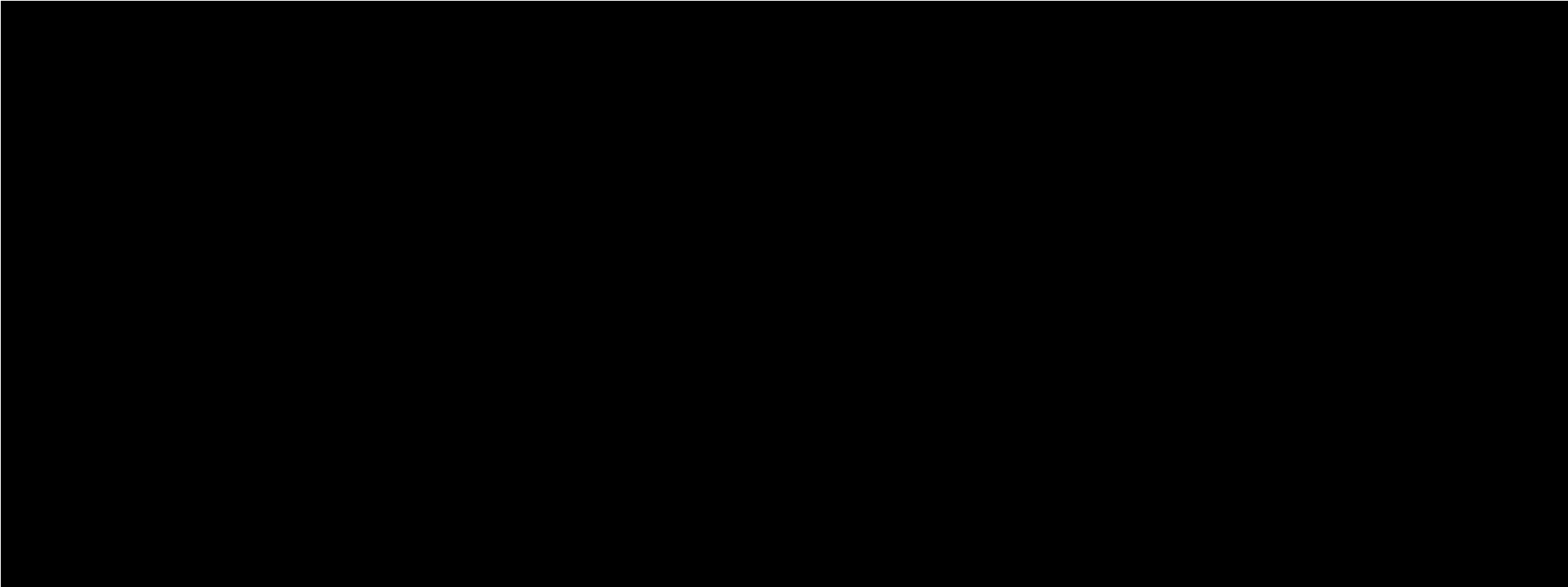
[19]: Assumed mid-year cashflows. See Rosen Report I, Schedule 1.

[20]: $1 / (1 + [2]) ^ (([19] - [1]) / 365)$.

[21]: [18] x [20].

[22]: The sum of [21].

**Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



[1]: Chodorow Report I, Section VI. B.

[2]: Chodorow Report I, Section VI. B.

[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**

Sources & Notes:

[1]: Chodorow Report I, Section VI. B.

[2]: Chodorow Report I, Section VI. B.

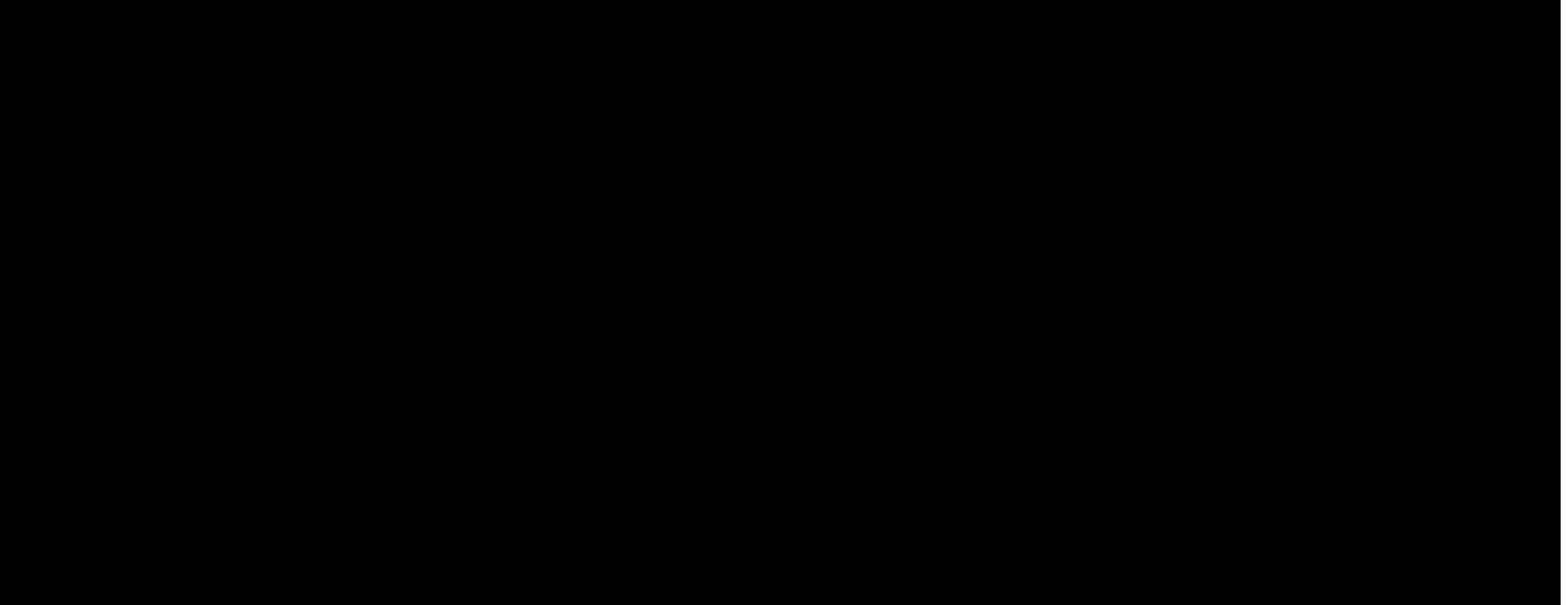
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI. B.

[2]: Chodorow Report I, Section VI. B.

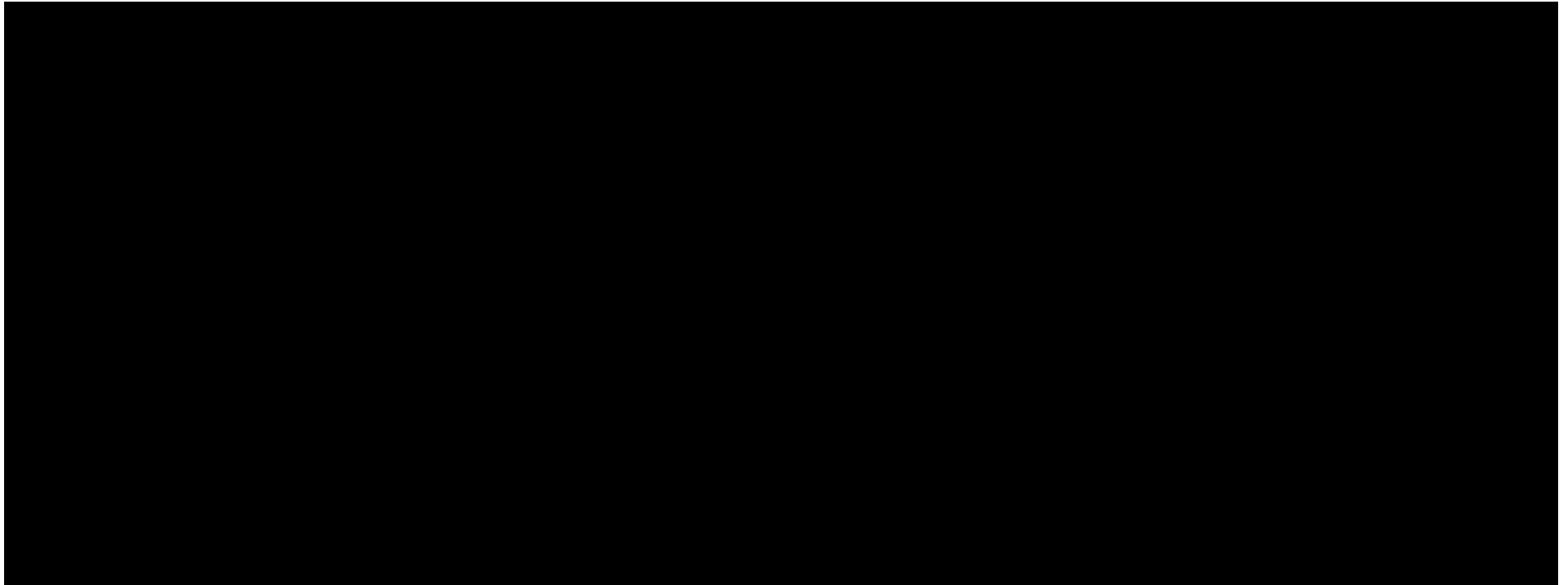
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI. B.

[2]: Chodorow Report I, Section VI. B.

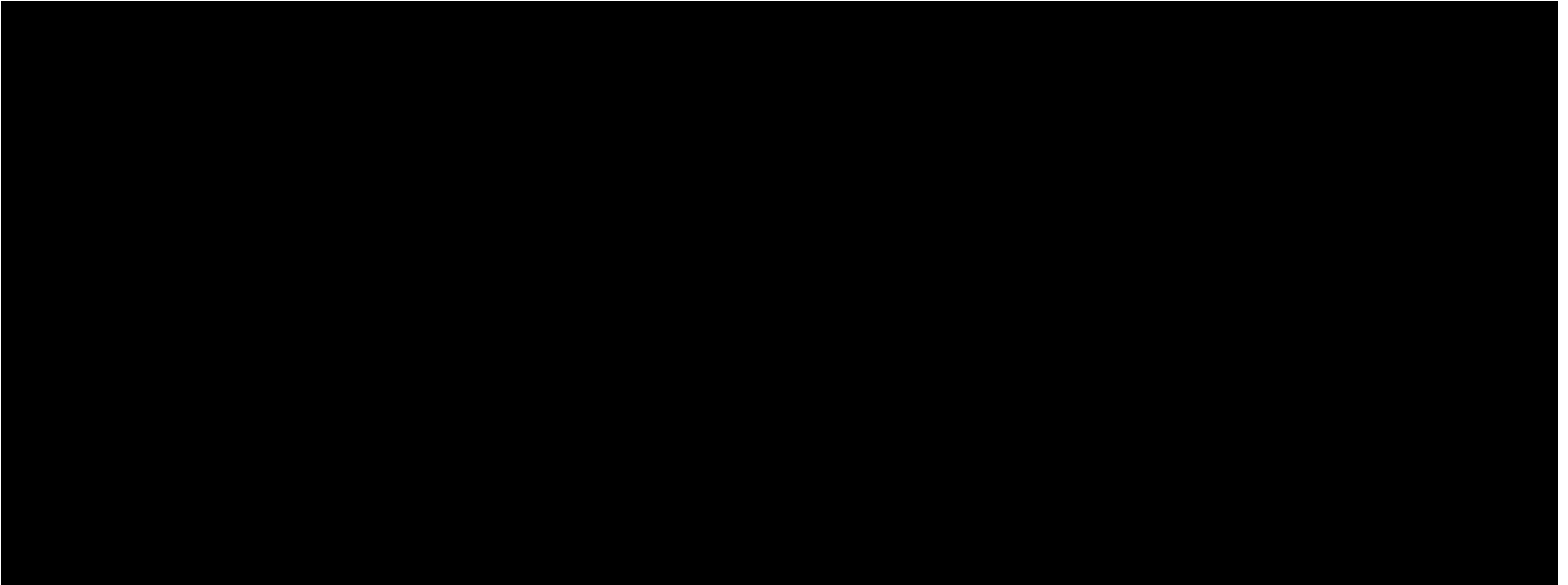
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI. B.

[2]: Chodorow Report I, Section VI. B.

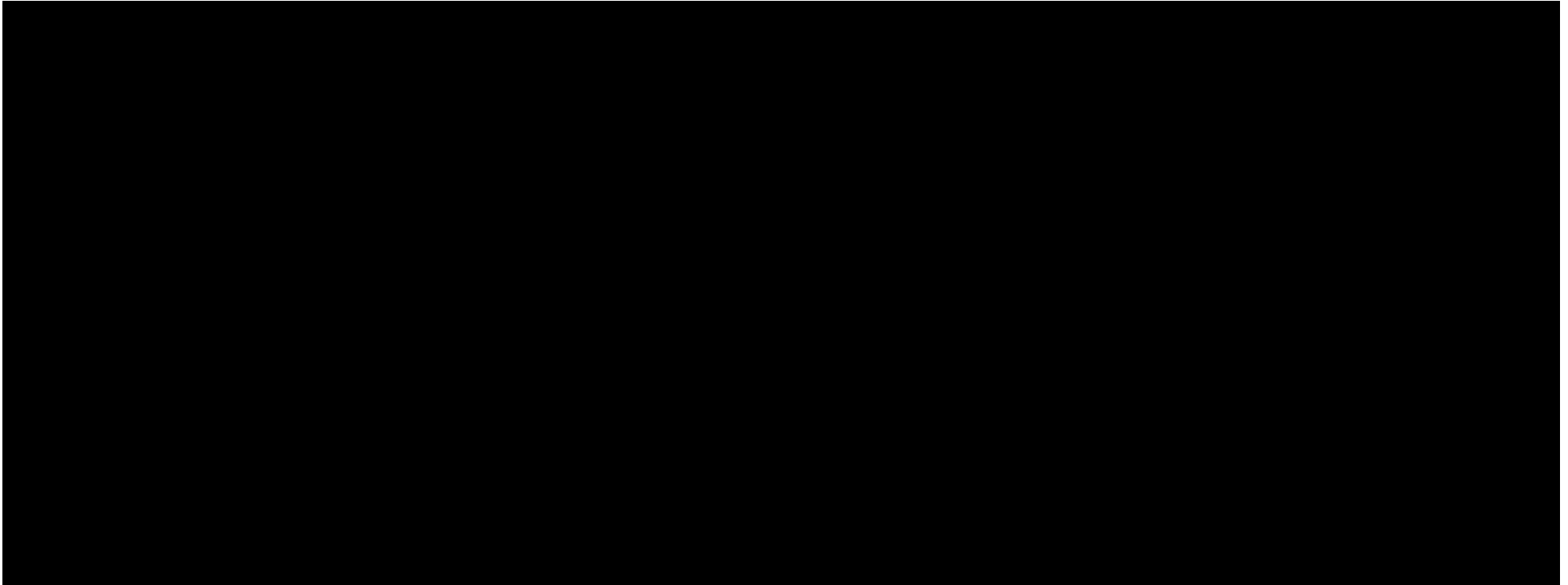
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI. B.

[2]: Chodorow Report I, Section VI. B.

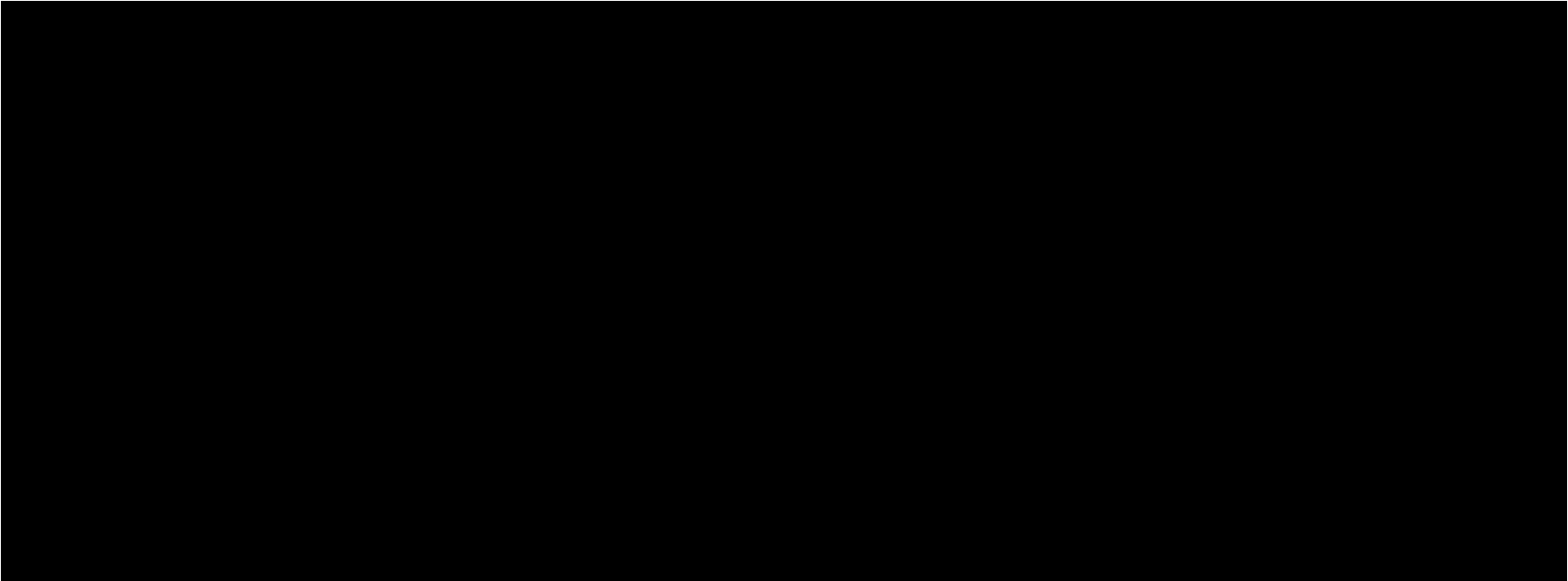
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table E.2: Delayed Brattle Schedule 2
Production, Sales, and Change in Inventory
(tons)**



Sources & Notes:

[1]: Chodorow Report I, Section VI. B.

[2]: Chodorow Report I, Section VI. B.

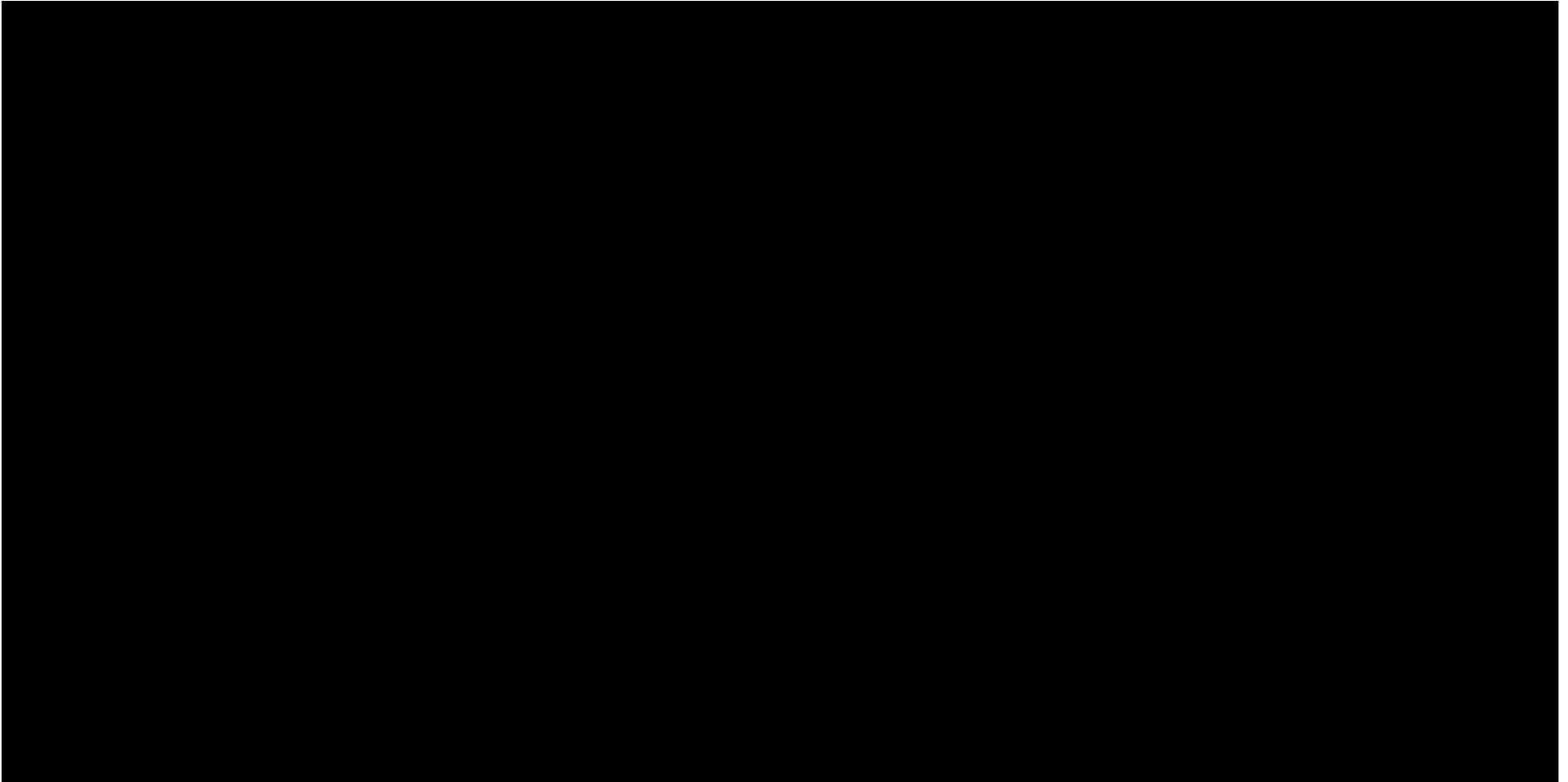
[3]: [1] - sum of [2].

[4]: [6] from the previous year.

[5]: [3].

[6]: [4] + [5].

**Table E.3: Delayed Brattle Schedule 3
Price and Freight (per ton & in 2007 US\$)**



Sources & Notes:

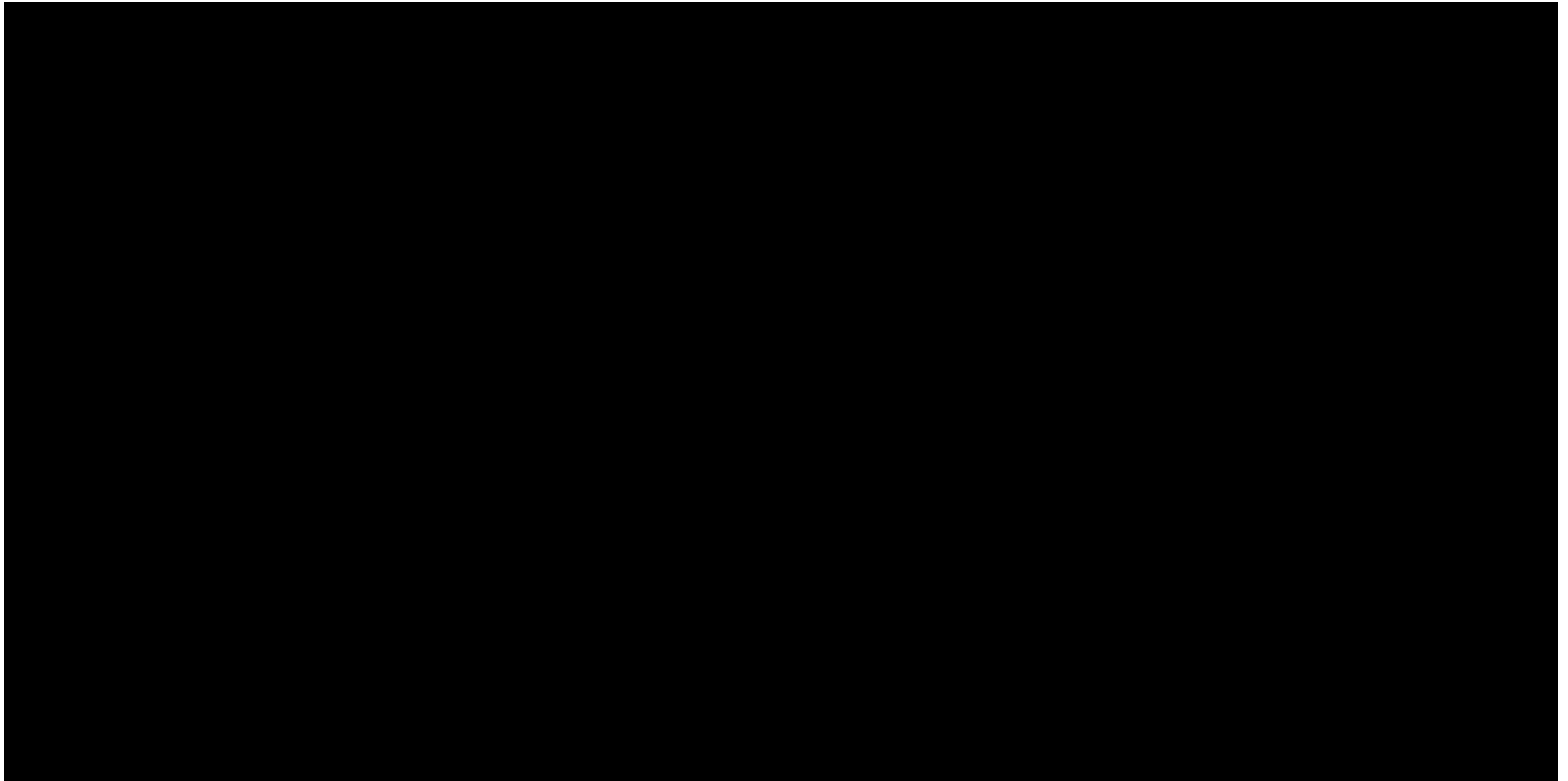
[1]: Table E.13.

[2]: Table E.14.

[3]: $0.125\% \times ([1] - [2])$.

[4]: $[1] - [2] - [3]$.

**Table E.3: Delayed Brattle Schedule 3
Price and Freight (per ton & in 2007 US\$)**



Sources & Notes:

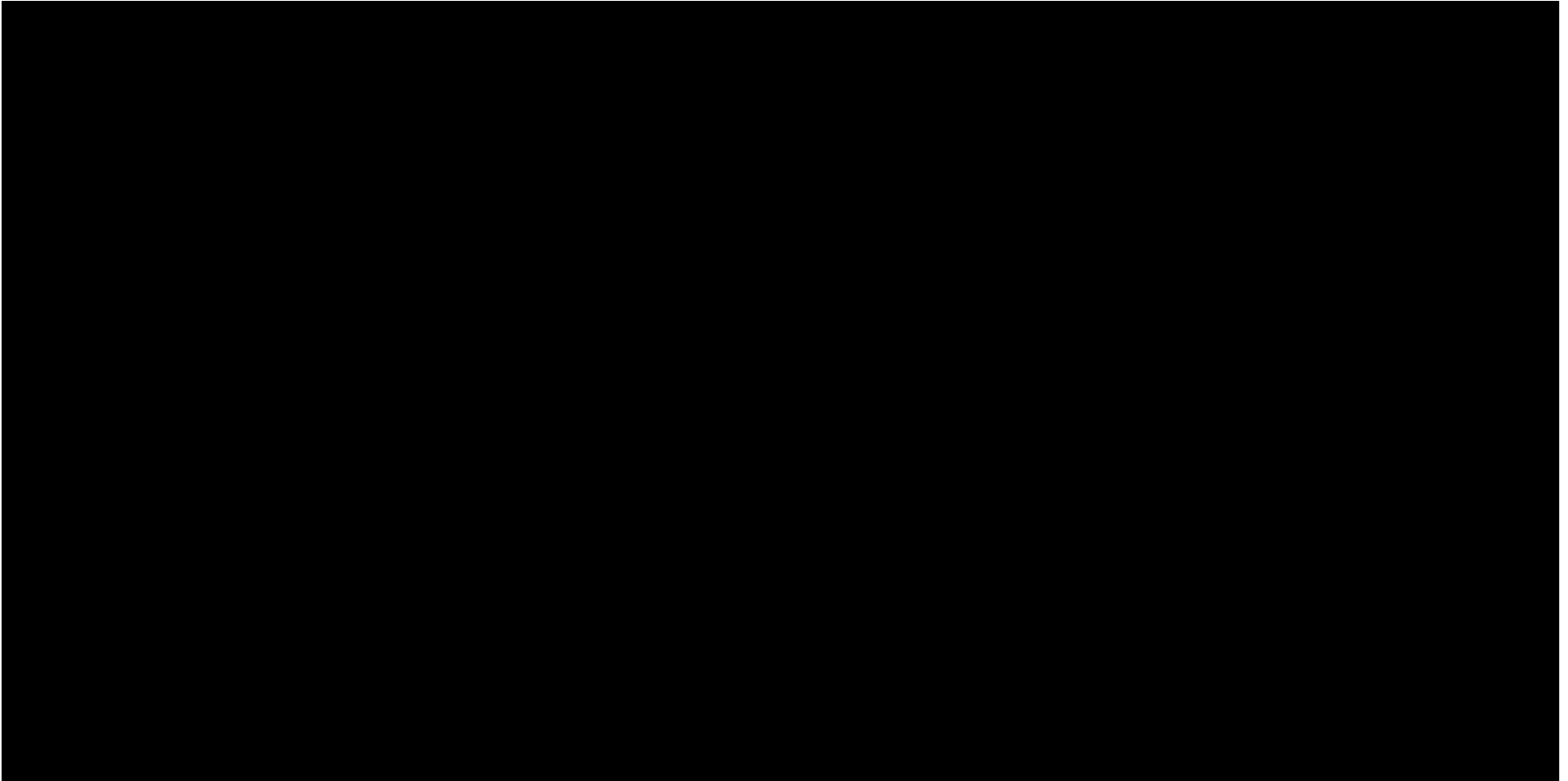
[1]: Table E.13.

[2]: Table E.14.

[3]: $0.125\% \times ([1] - [2])$.

[4]: $[1] - [2] - [3]$.

**Table E.3: Delayed Brattle Schedule 3
Price and Freight (per ton & in 2007 US\$)**



Sources & Notes:

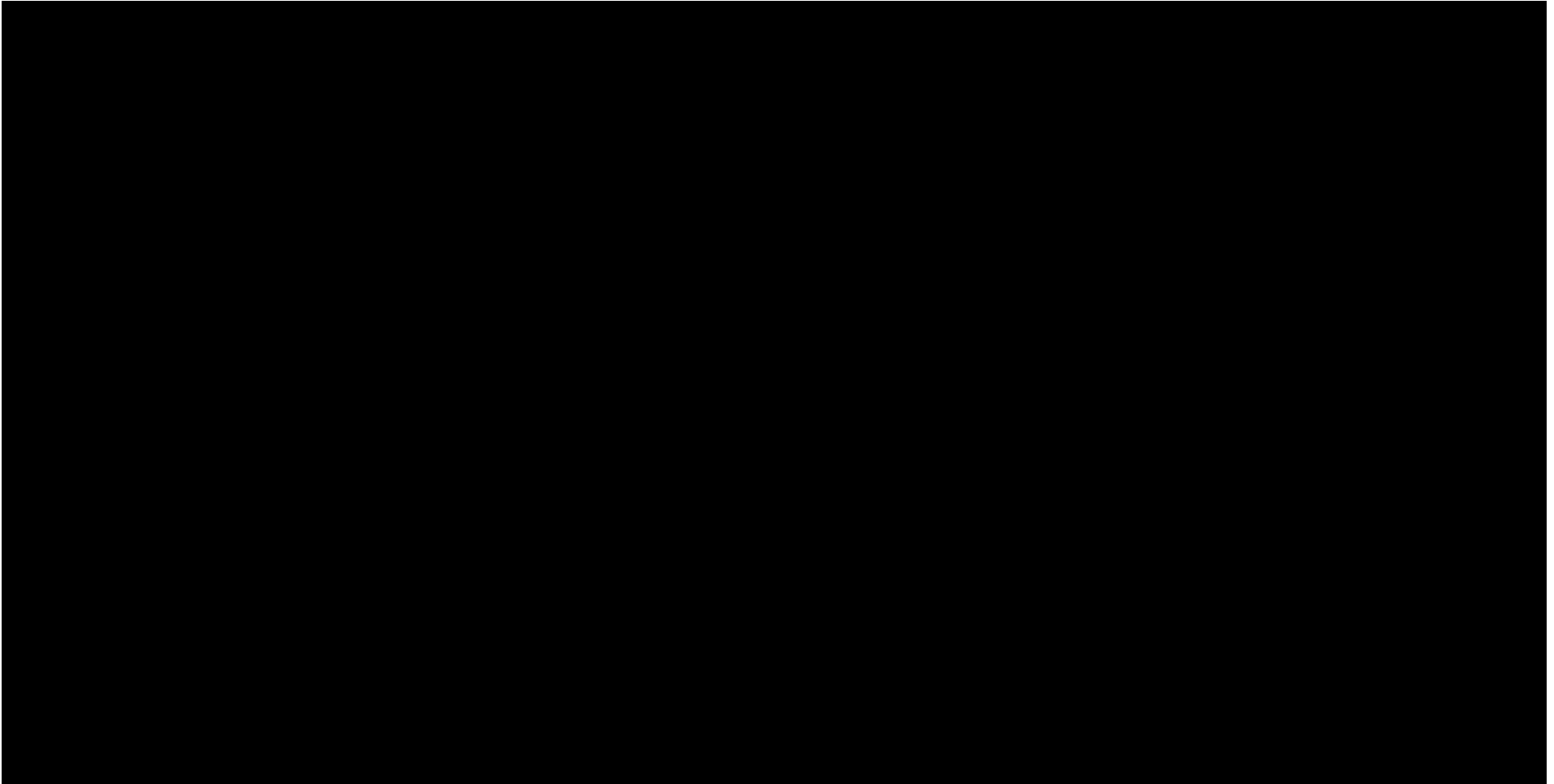
[1]: Table E.13.

[2]: Table E.14.

[3]: $0.125\% \times ([1] - [2])$.

[4]: $[1] - [2] - [3]$.

**Table E.3: Delayed Brattle Schedule 3
Price and Freight (per ton & in 2007 US\$)**



Sources & Notes:

[1]: Table E.13.

[2]: Table E.14.

[3]: $0.125\% \times ([1] - [2])$.

[4]: $[1] - [2] - [3]$.

**Table E.4: Delayed Brattle Schedule 4
Operating Costs
(Converted to 2007 US\$)**

[1]: Canadian CPI, Bloomberg.

Inflation figures are from four years previous to each labeled year.

[2]: Nominal year in which values were reported in Rosen and SCMA Report.

[3]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table E.15.

[5]: SCMA Report I.

[6]: $[5] \times [3] / [4]$.

**Table E.4: Delayed Brattle Schedule 4
Operating Costs
(Converted to 2007 US\$)**

[1]: Canadian CPI, Bloomberg.

Inflation figures are from four years previous to each labeled year.

[2]: Nominal year in which values were reported in Rosen and SCMA Report.

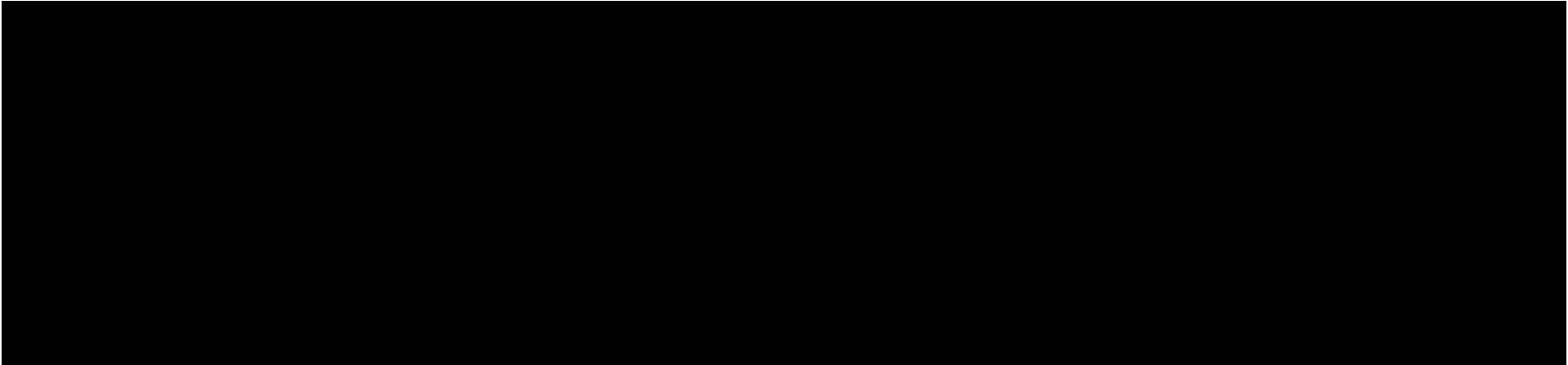
[3]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table E.15.

[5]: SCMA Report I.

[6]: $[5] \times [3] / [4]$.

**Table E.4: Delayed Brattle Schedule 4
Operating Costs
(Converted to 2007 US\$)**



Sources & Notes:

[1]: Canadian CPI, Bloomberg.

Inflation figures are from four years previous to each labeled year.

[2]: Nominal year in which values were reported in Rosen and SCMA Report.

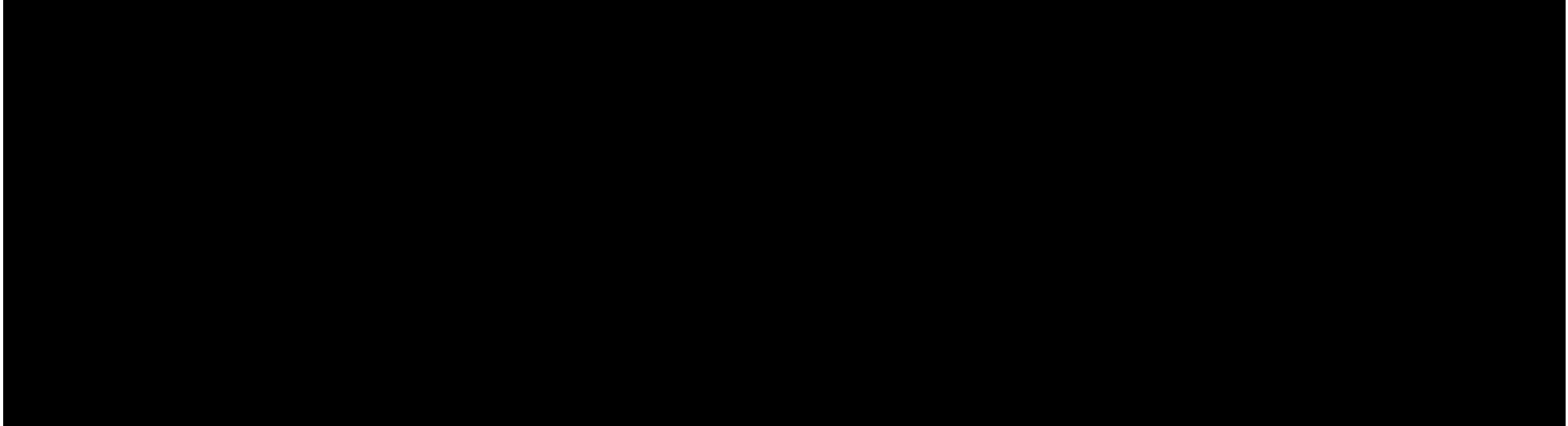
[3]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table E.15.

[5]: SCMA Report I.

[6]: $[5] \times [3] / [4]$.

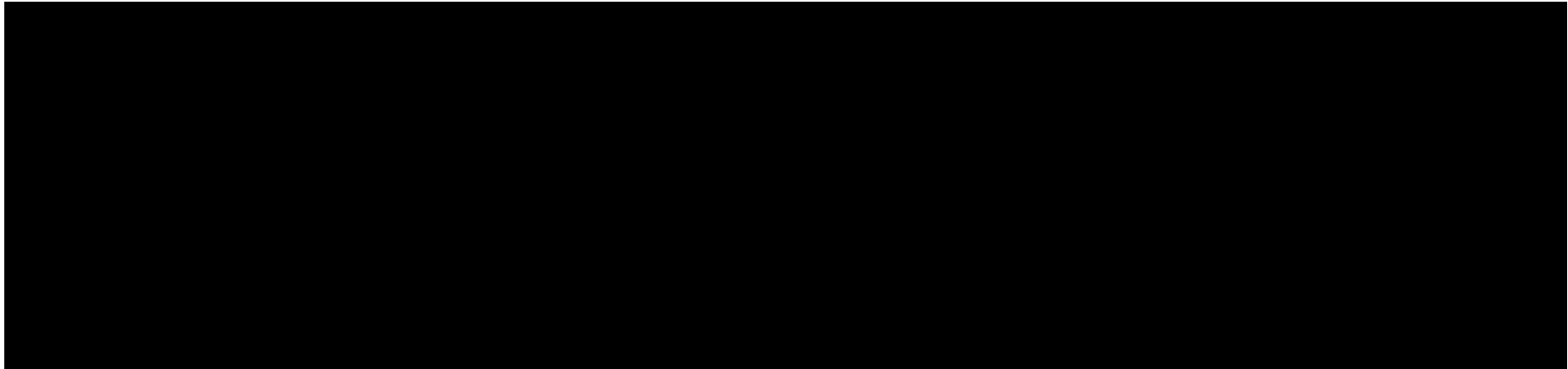
**Table E.4: Delayed Brattle Schedule 4
Operating Costs
(Converted to 2007 US\$)**



Inflation figures are from four years previous to each labeled year.

- [2]: Nominal year in which values were reported in Rosen and SCMA Report.
- [3]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.
- [4]: Table E.15.
- [5]: SCMA Report I.
- [6]: $[5] \times [3] / [4]$.

**Table E.4: Delayed Brattle Schedule 4
Operating Costs
(Converted to 2007 US\$)**



Sources & Notes:

[1]: Canadian CPI, Bloomberg.

Inflation figures are from four years previous to each labeled year.

[2]: Nominal year in which values were reported in Rosen and SCMA Report.

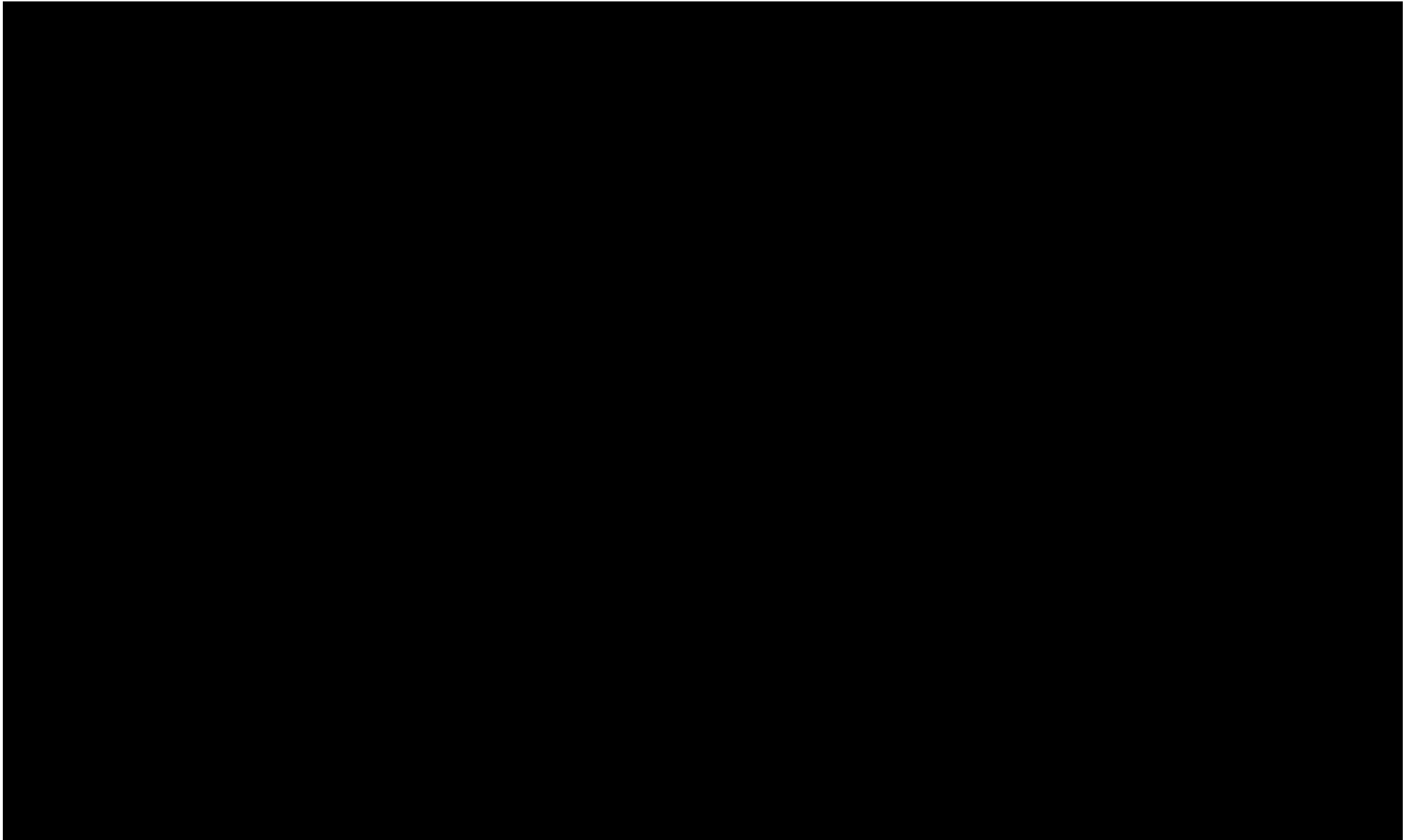
[3]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through [2], where n is 0.19 for 2007, 0.5 for [2], and 1 for all years in-between.

[4]: Table E.15.

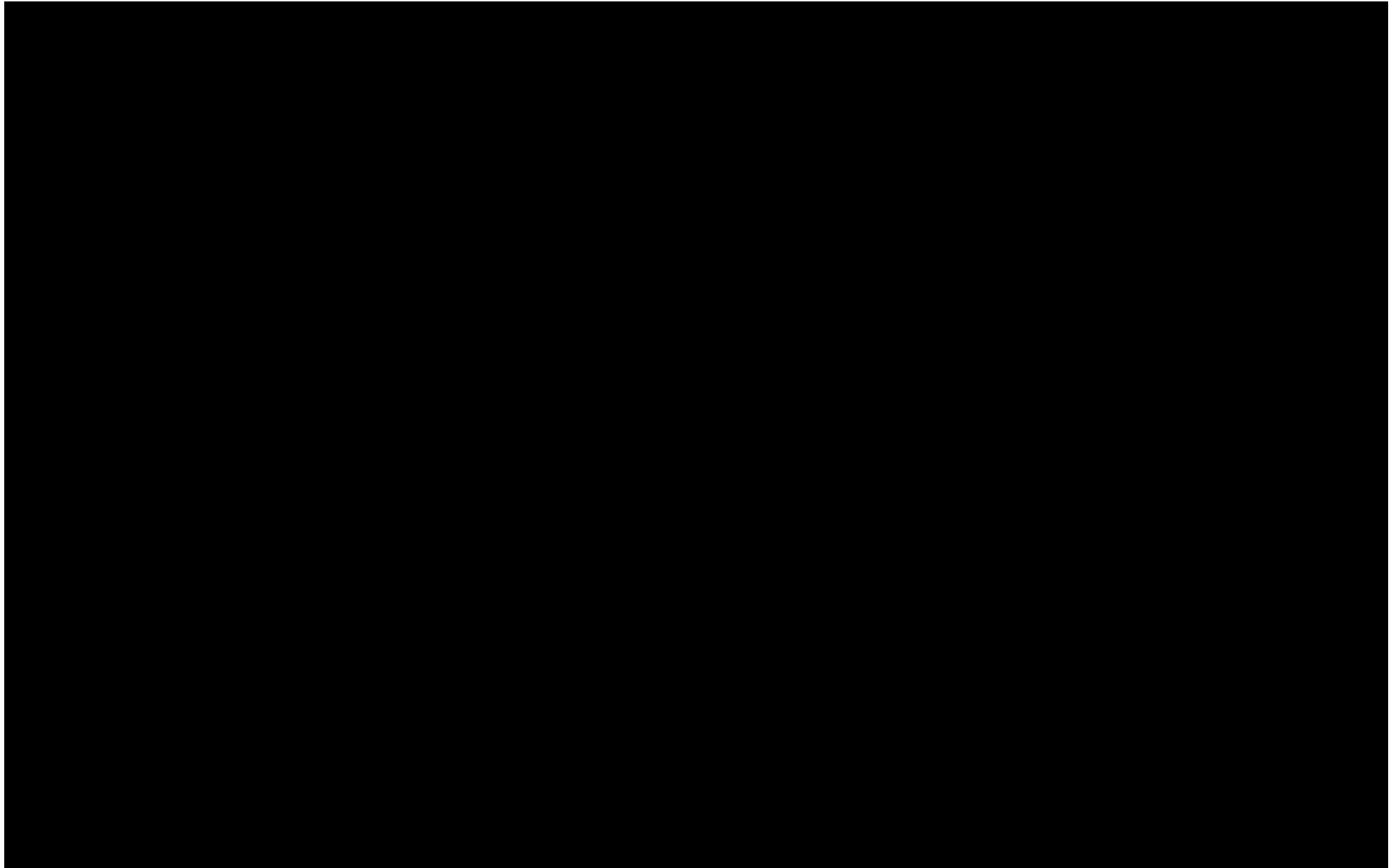
[5]: SCMA Report I.

[6]: $[5] \times [3] / [4]$.

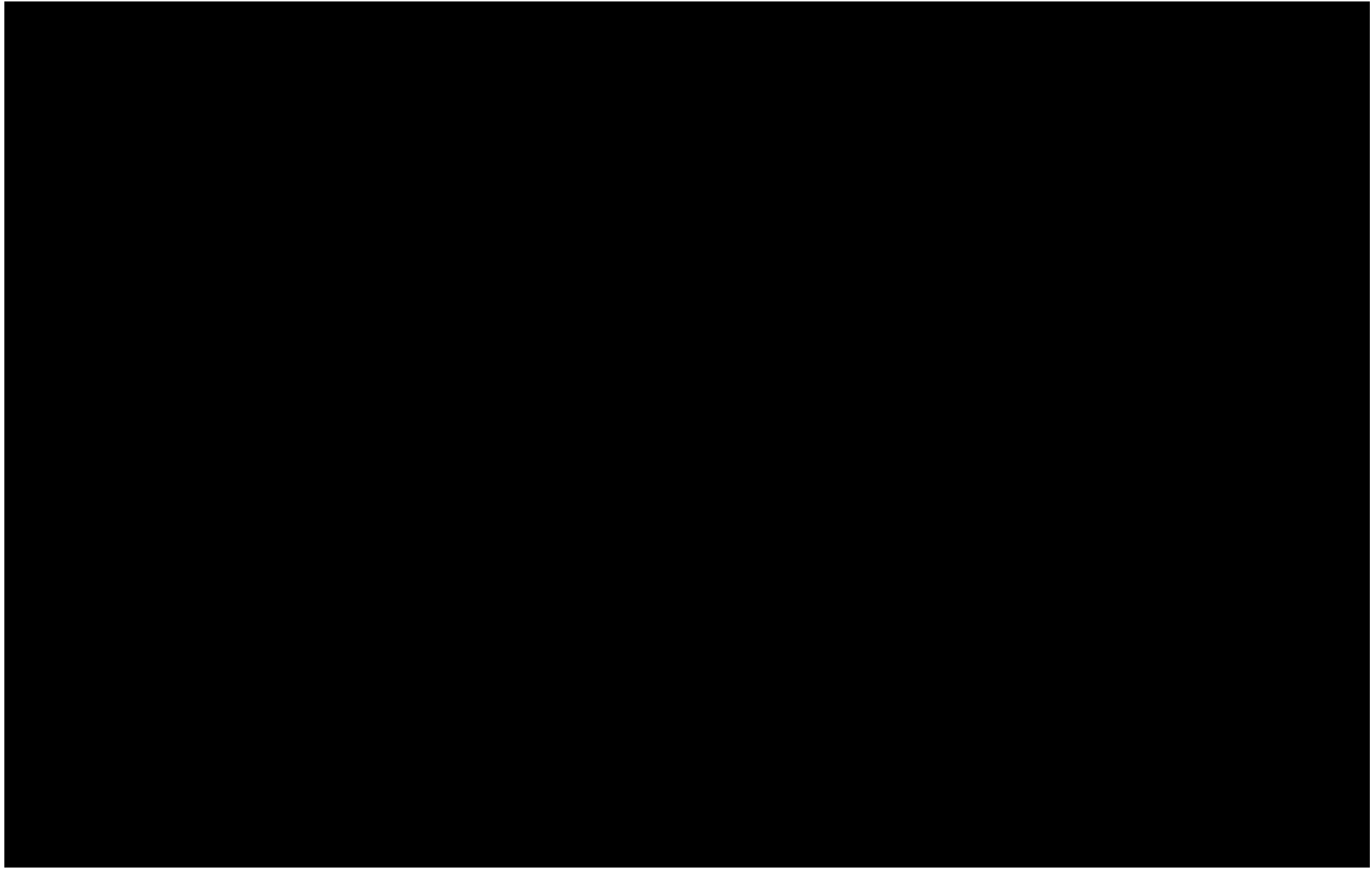
**Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US\$)**



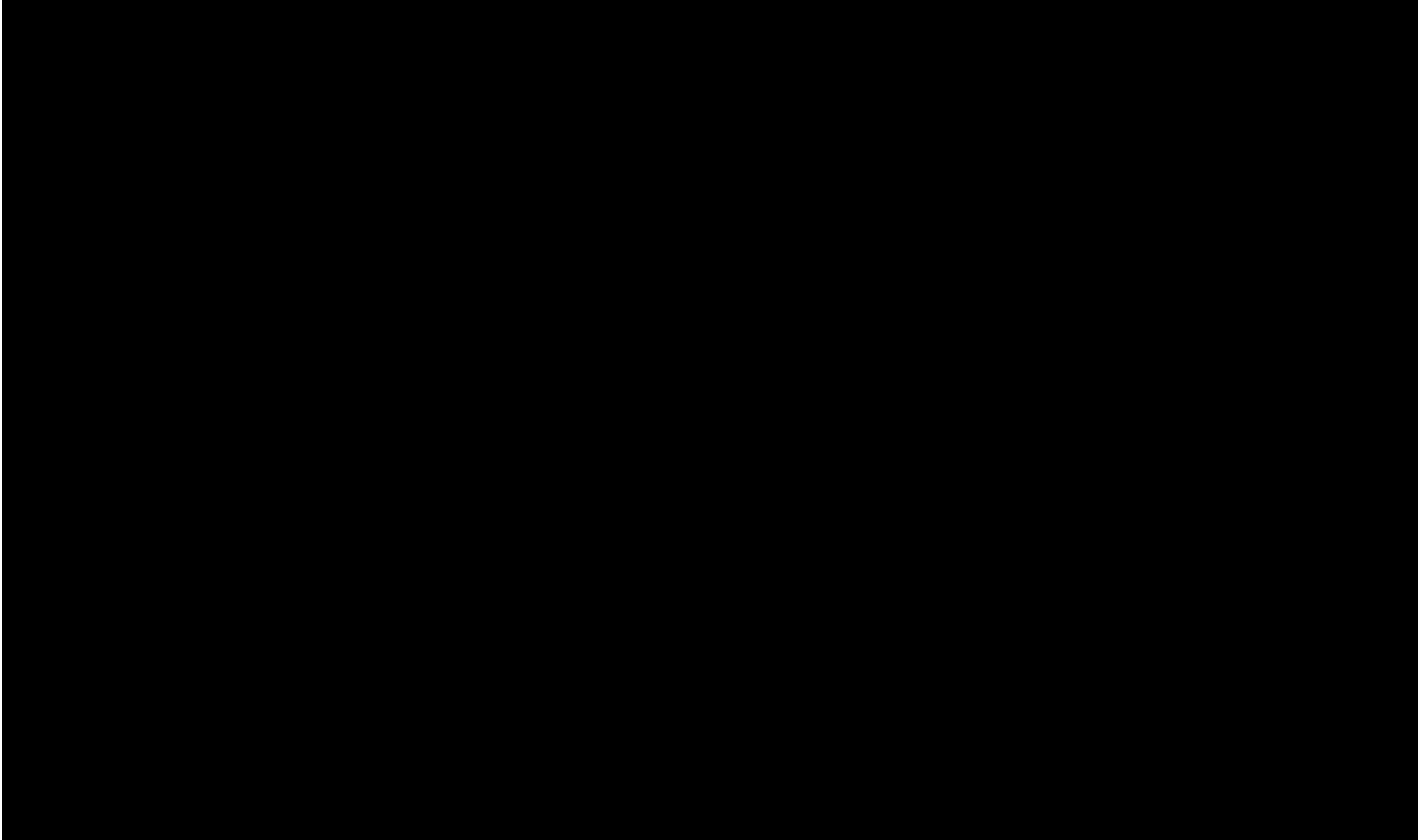
**Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US\$)**



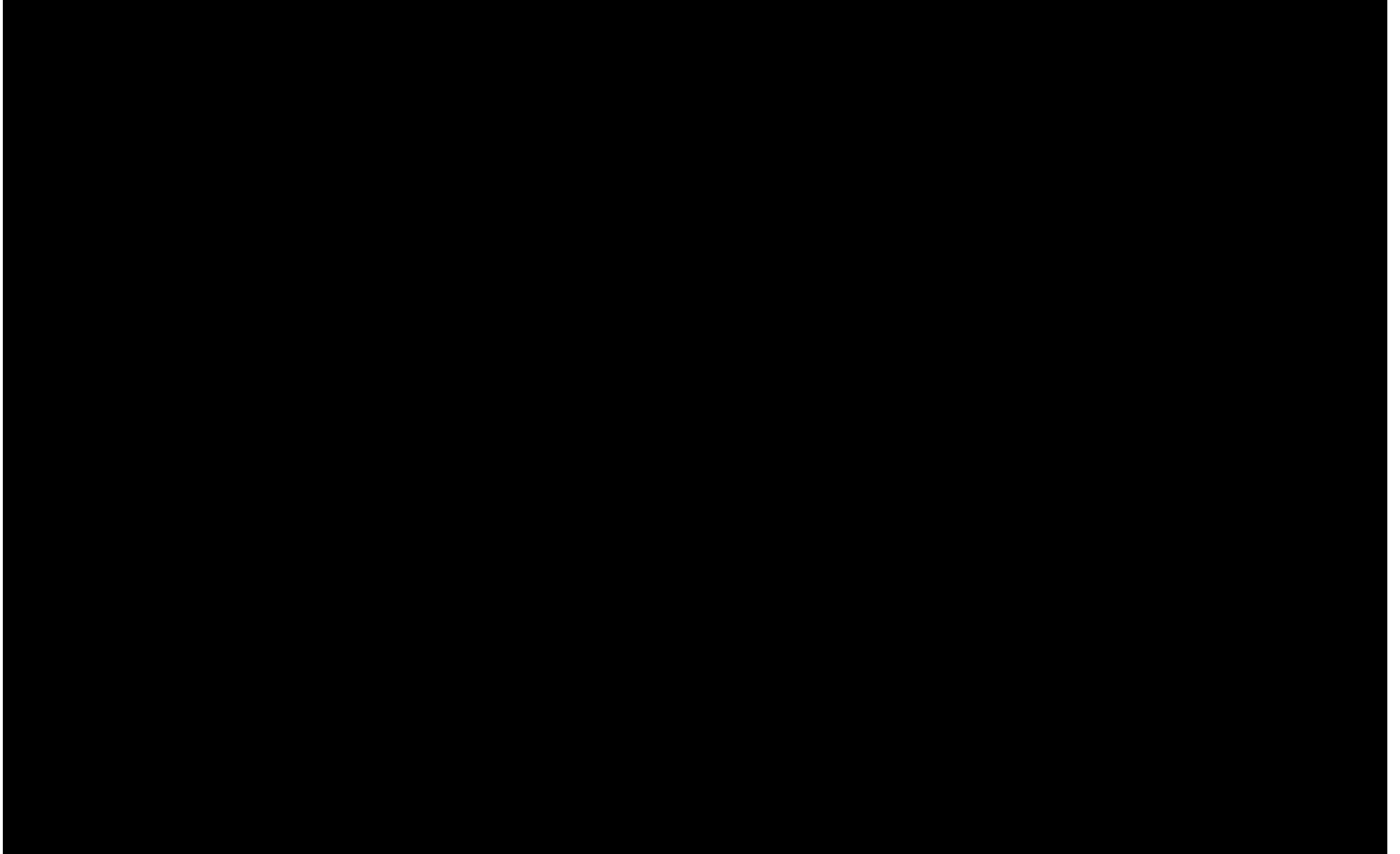
**Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US\$)**



**Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US\$)**



**Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US\$)**



**Table E.5: Delayed Brattle Schedule 5
Capital Expenditures (Converted to 2007 US\$)**

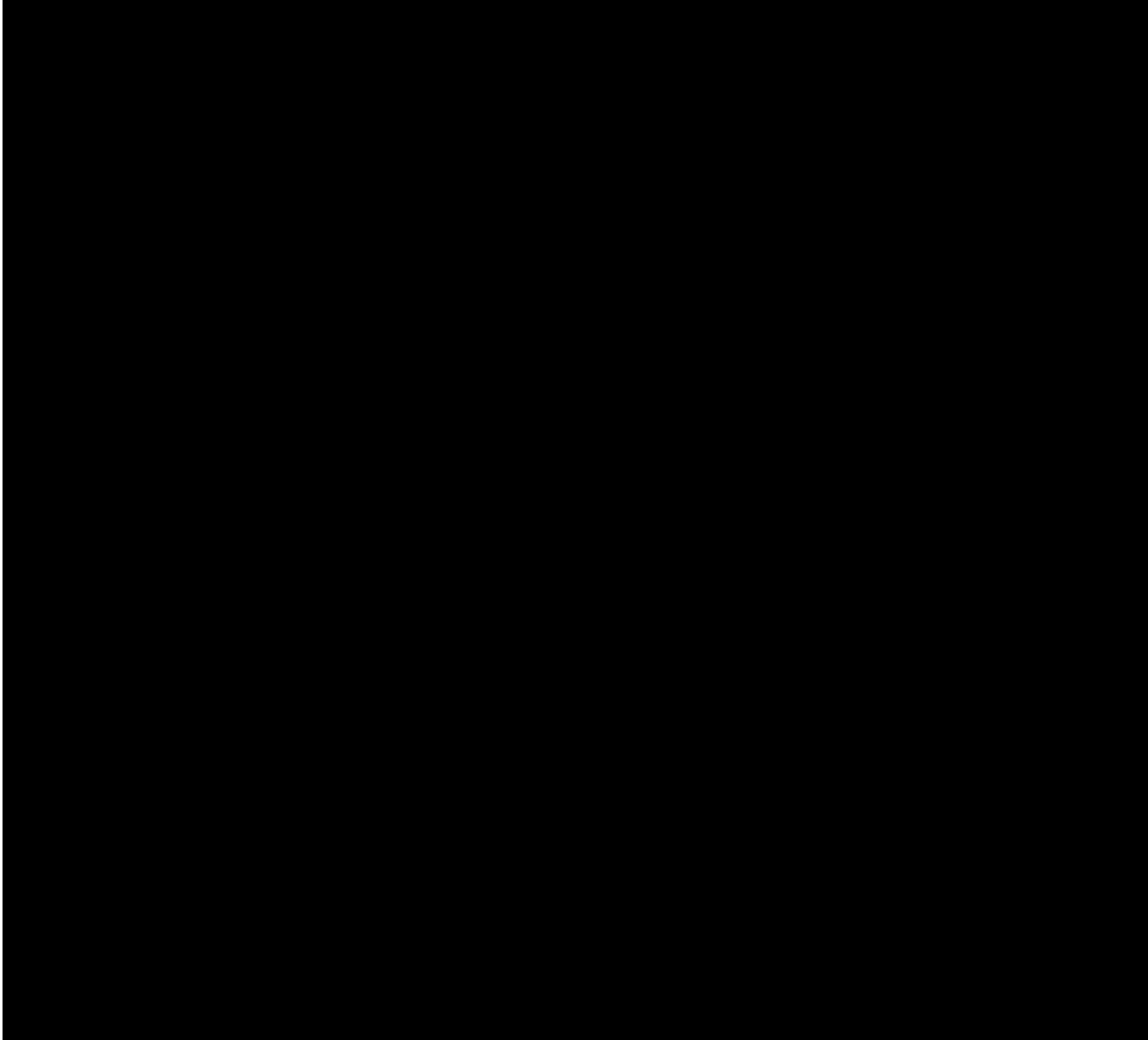


Table E.5: Delayed Brattle Schedule 5 Capital Expenditures (Converted to 2007 US\$)

Sources & Notes:

[1]: C/US\$ foreign exchanges rates, Bloomberg.

[2]: Table E.15.

[3]: Nominal year in which values were reported in Rosen Report I.

[4]: U.S. CPI, Bloomberg. Inflation is taken from four years previous to each labeled year, due to the delay.

[5]: Canadian CPI, Bloomberg. Inflation is taken from four years previous to each labeled year, due to the delay.

[6], [10], [13], [16], [20], [24]: Rosen Report I, Schedule 5. Initial outlays are corrected for the price of Crusher 1 in 2012, per C-1342, p.17. Initial outlays are corrected by SCMA in 2013 and 2014.

[7]: The sum of [6].

[8]: $1 / (1 + [4])^{0.19}$ using [4] from when [3] is 2007, multiplied by $1 / (1 + [4])^{0.5}$ using [4] from when [3] is 2008.

[9]: [7] x [8].

[11]: $1 / (1 + [4])^{0.19}$ using [4] from when [3] is 2007, multiplied by $1 / (1 + [4])^{0.5}$ using [4] from when [3] is 2008.

[12]: [10] x [11].

[13]: Mr. Rosen's calculated marine load-out facility costs in nominal US\$. Mr. Rosen does not explain why he converts the marine load-out facility costs to US\$ in 2006 and inflates using U.S. CPI.

[14]: $(1 + [5])^{0.5}$ using [5] from when [3] is 2006, multiplied by $(1 + [5])^{0.81}$ using [5] from when [3] is 2007 .

[15]: [13] x [14].

[17]: $1 / (1 + [5])^{0.19}$ using [5] from when [3] is 2007, multiplied by $1 / (1 + [5])^1$ using [5] from years when [3] is between 2007 and the originally scheduled year of production, multiplied by $1 / (1 + [5])^{0.5}$ using [5] from when [3] is the originally scheduled year.

[18]: [16] x [17].

[19]: [18] / [2].

[21]: $1 / (1 + [5])^{0.19}$ using [5] from when [3] is 2007, multiplied by $1 / (1 + [5])^1$ using [5] from years when [3] is between 2007 and the originally scheduled year of production, multiplied by $1 / (1 + [4])^{0.5}$ using [4] from when [3] is the originally scheduled year.

[22]: [20] x [21].

[23]: [22] / [2].

[25]: $1 / (1 + [4])^{0.19}$ using [4] from when [3] is 2007, multiplied by $1 / (1 + [4])^1$ using [4] from years when [3] is between 2007 and the originally scheduled year of production, multiplied by $1 / (1 + [5])^{0.5}$ using [5] from when [3] is the originally scheduled year.

[26]: [24] x [25].

[27]: [9] + [12] + [15] + [19] + [23] + [26]. Mr. Rosen excludes land acquisition costs, which are included here.

Table E.6: Delayed Brattle Schedule 6
Maintenance Costs - Mobile Equipment (Converted to 2007 US\$)

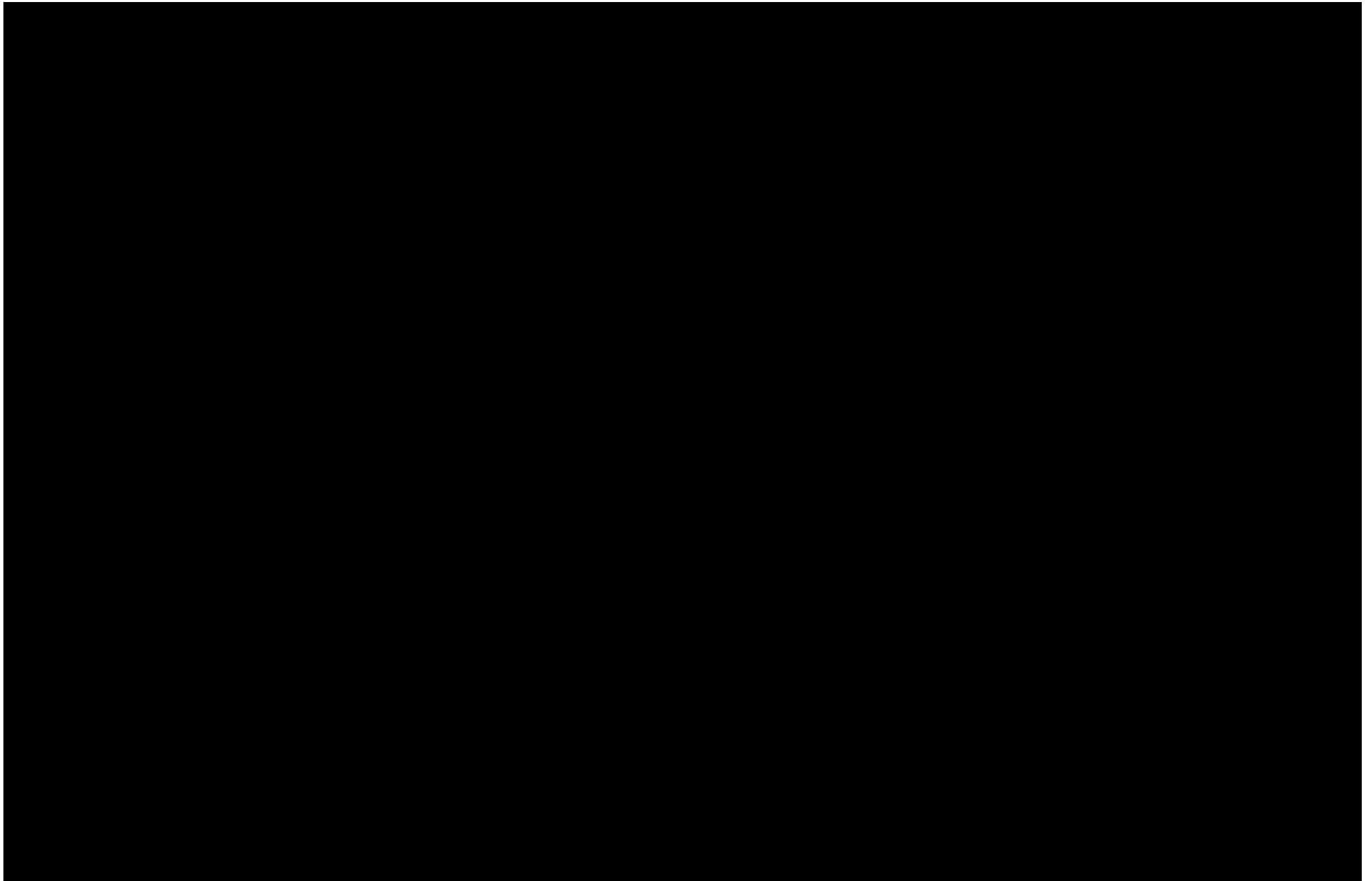


Table E.6: Delayed Brattle Schedule 6
Maintenance Costs - Mobile Equipment (Converted to 2007 US\$)

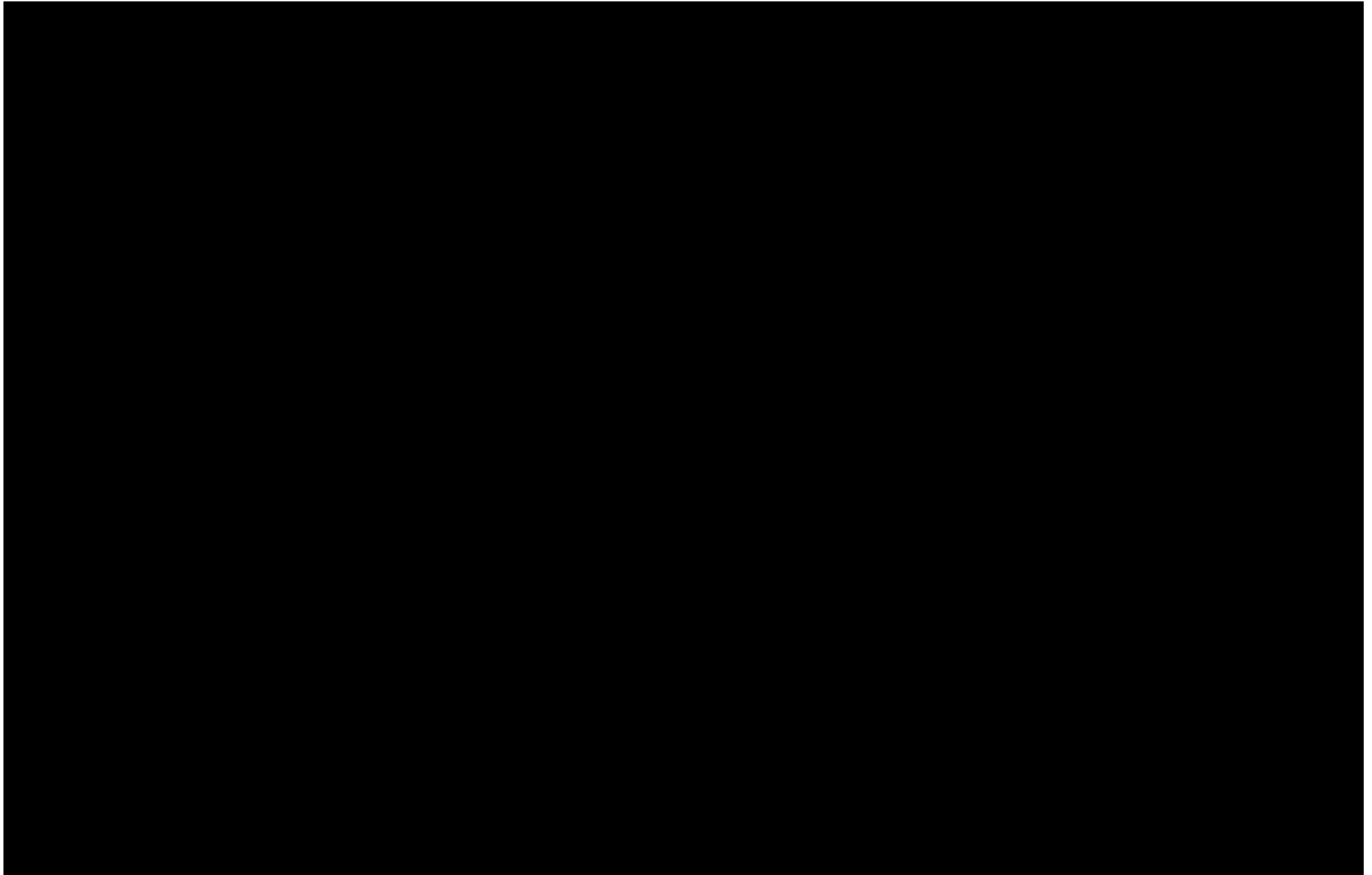
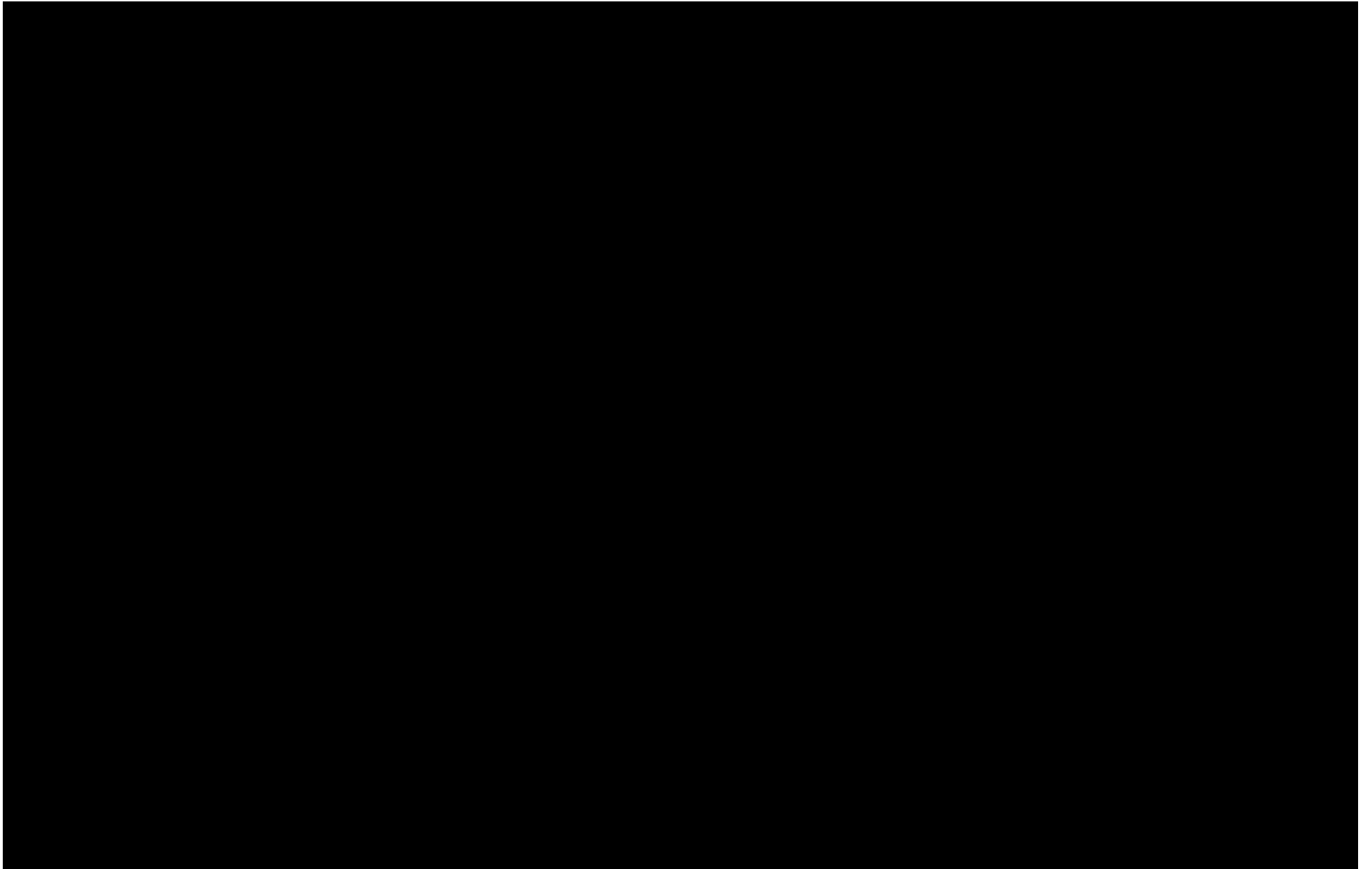


Table E.6: Delayed Brattle Schedule 6
Maintenance Costs - Mobile Equipment (Converted to 2007 US\$)



**Table E.6: Delayed Brattle Schedule 6
Maintenance Costs - Mobile Equipment (Converted to 2007 US\$)**

Sources & Notes:

[1]: Rosen Report I, Schedule 6.

See SCMA Report I.

[2]: U.S. CPI, Bloomberg.

[3]: Nominal Year in which values were reported in Rosen Report I.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from when [3] is 2007, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from when [3] is 2008.

[5]: Production Factor. See SCMA Report I.

[6]: [1] x [4].

[7]: 1% of [6] in Year 1 and Year 2, 2% in Year 3 onward.

[8]: [5] x 1% of [6] in Year 1 and Year 2, [5] x 2% of [6] in Year 3 onward.

[9]: The sum of [7] through [8].

Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)

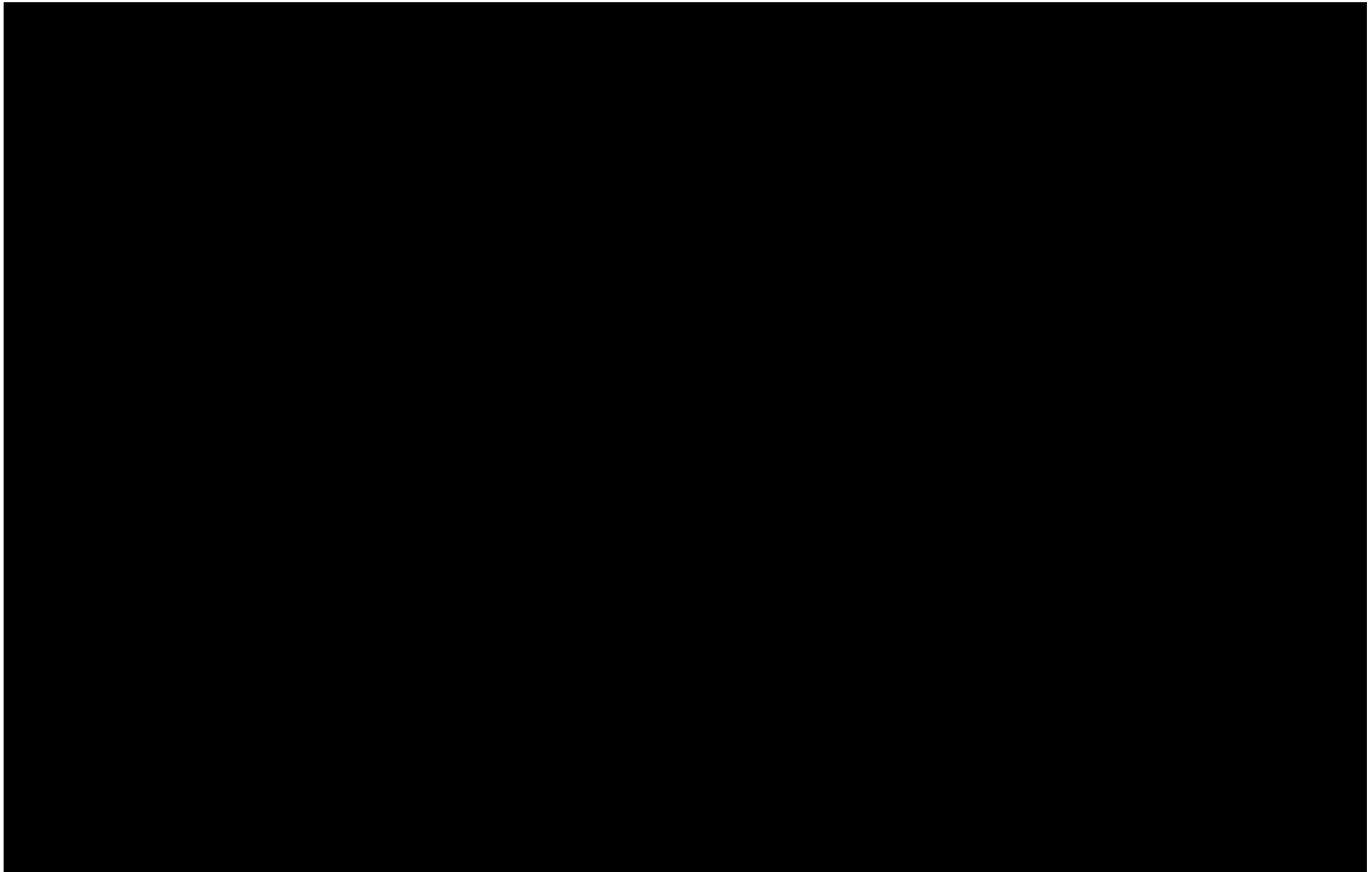


Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)

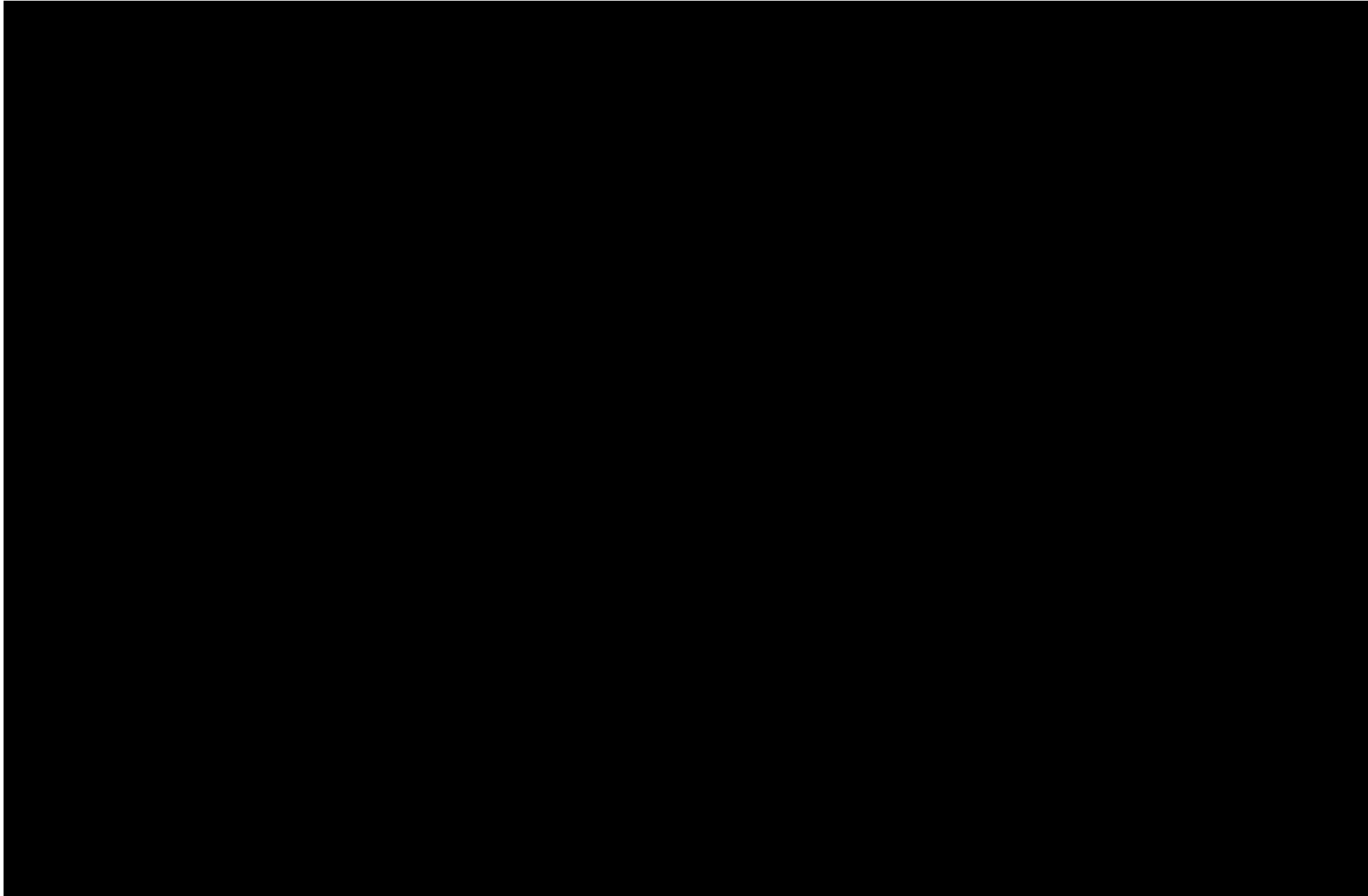


Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)

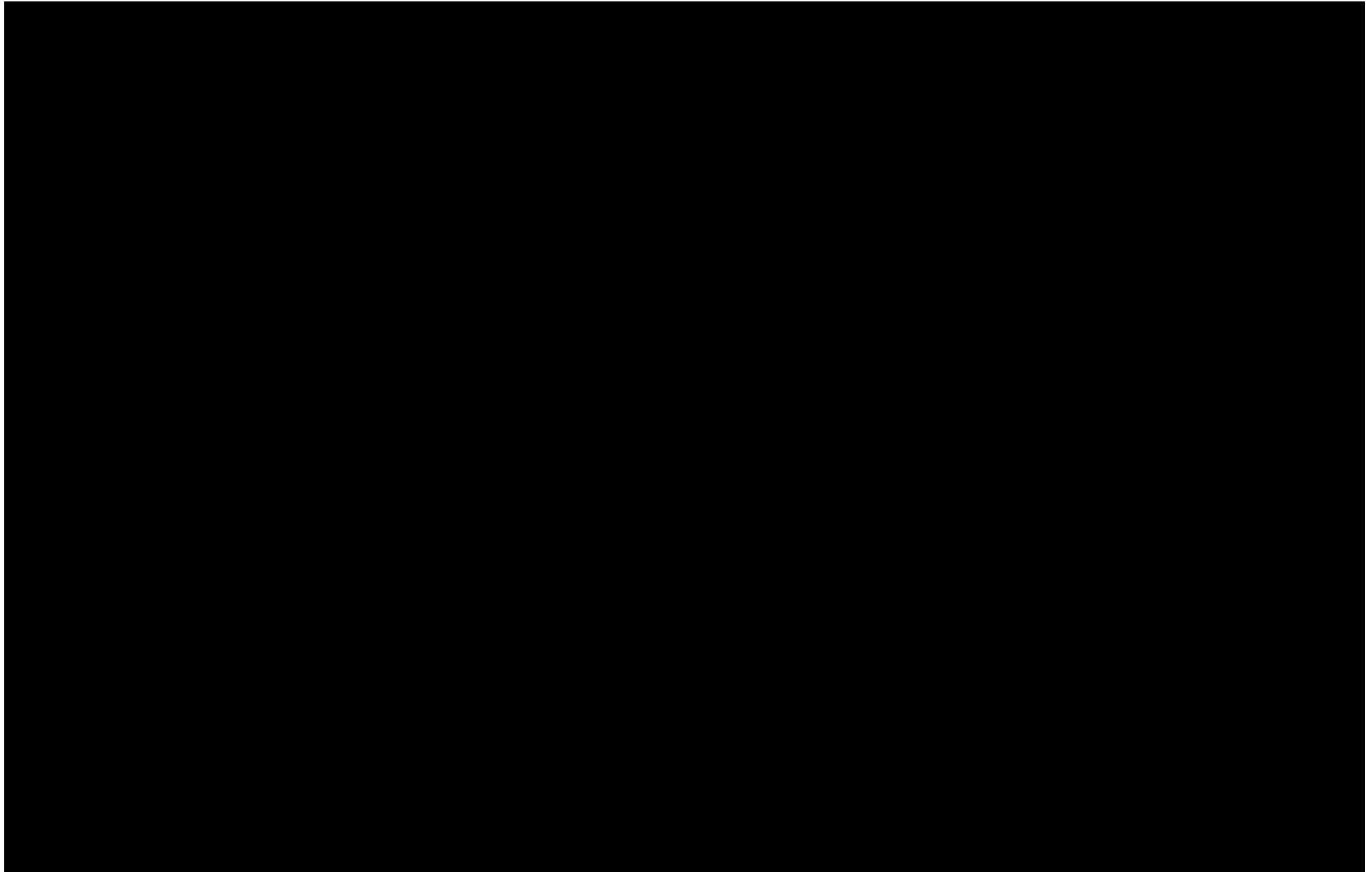


Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)

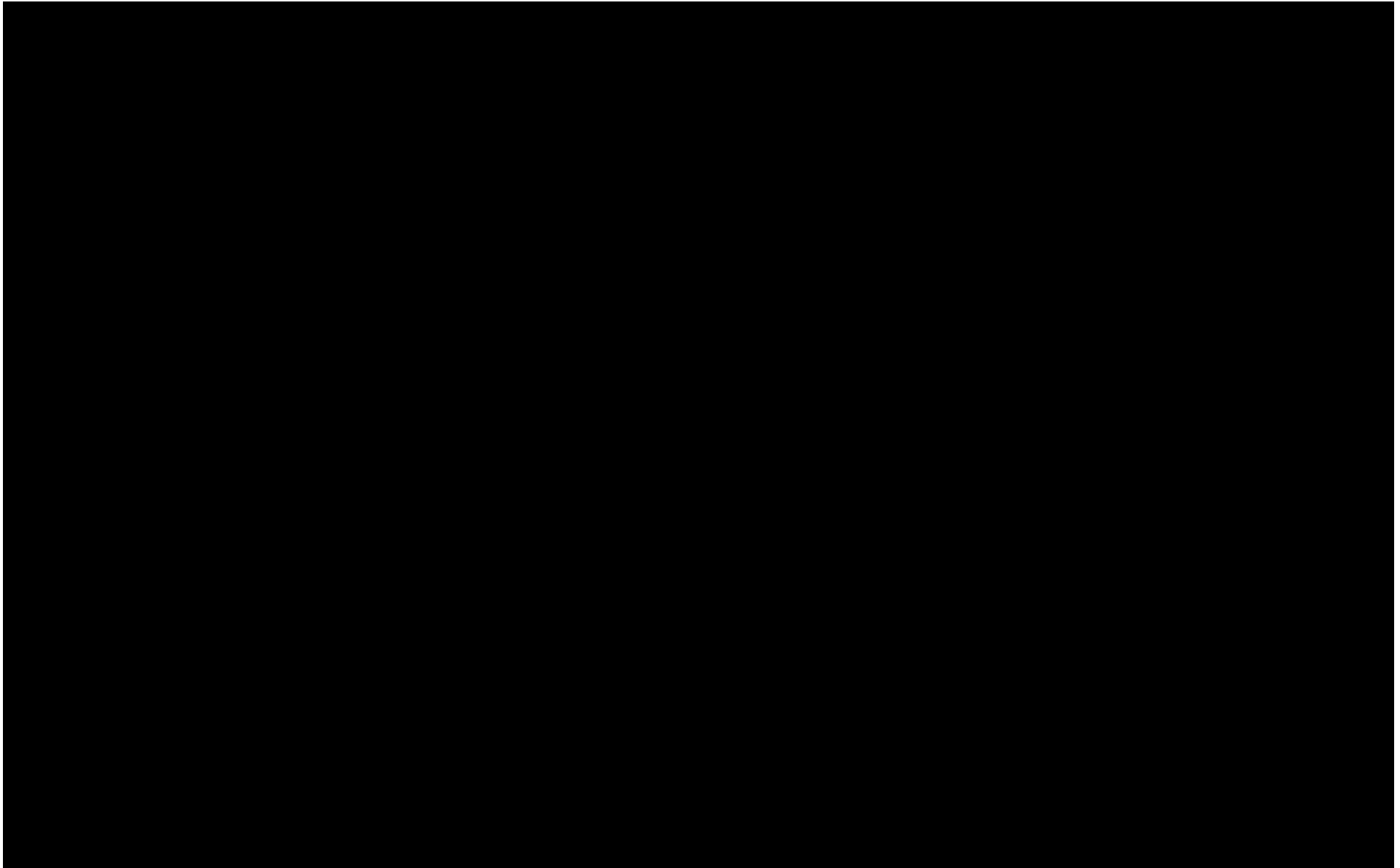
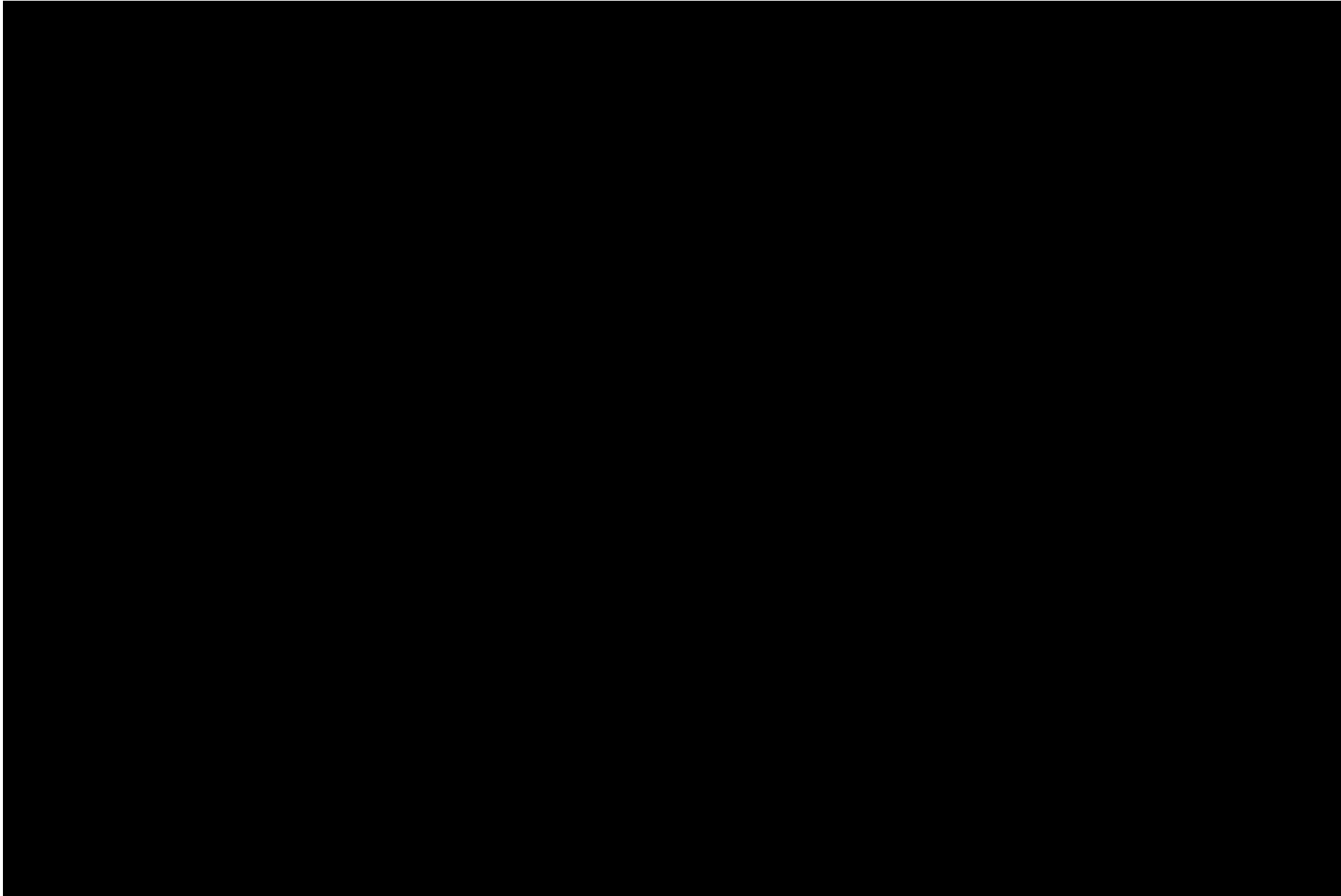


Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)



**Table E.7: Delayed Brattle Schedule 7
Maintenance Costs - Plant Equipment (Converted to 2007 US\$)**

Sources & Notes:

[1]: Rosen Report I, Schedule 7, with the [REDACTED] per Exhibit C-1342, p.17.

[2]: Rosen CPI (Bloomberg).

[3]: Nominal Year in which values were reported in Rosen Report I.
 $1 / (1 + [2])^{0.19}$ using [2] from when 3 is 2007, multiplied by $1 / (1 + [2])^{0.5}$
using [2] from when 3 is 2008.

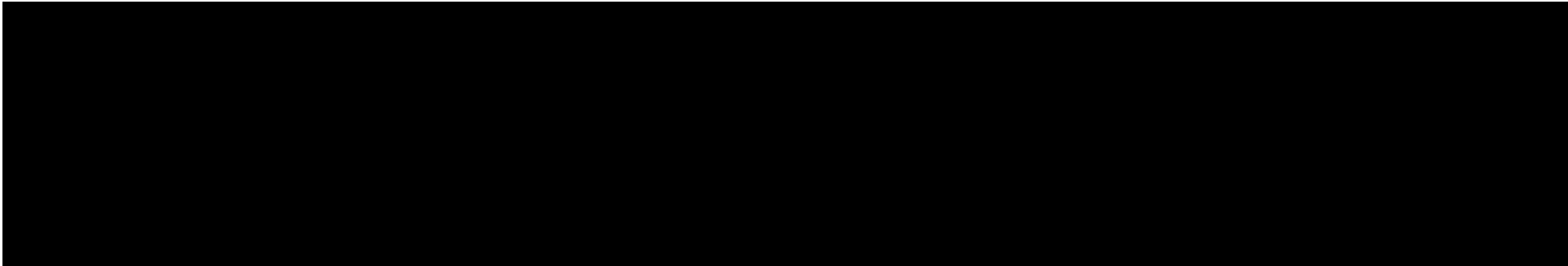
[5]: Production Factor. See SCMA Rejoinder Report and SCMA Report I.

[6]: [1] x [4].

[7]: [5] x 2% of [6] in Years 1 to 2; [5] x 3% of [6] in Years 3 to 6, and [5] x 4% of [6] in Year 7 onward.

[8]: The sum of [7].

**Table E.8: Delayed Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



Sources & Notes:

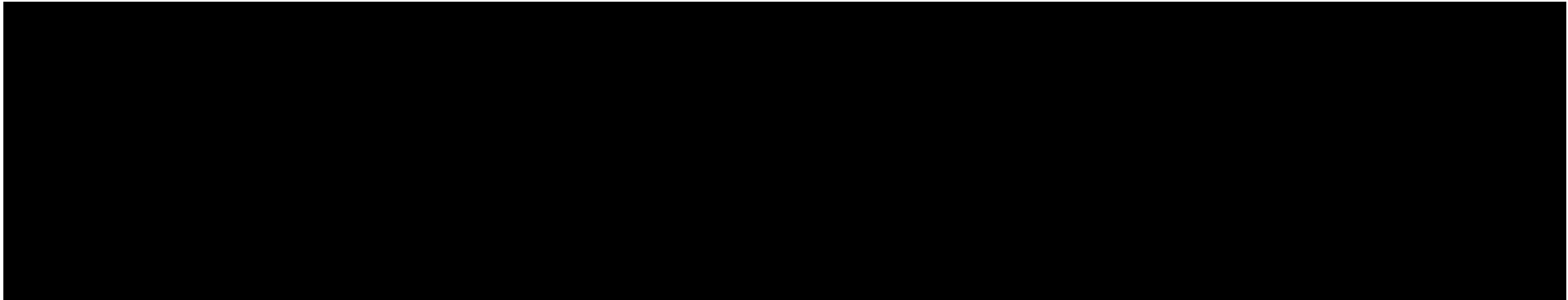
[1]: Table E.5.

[2]: Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table E.8: Delayed Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



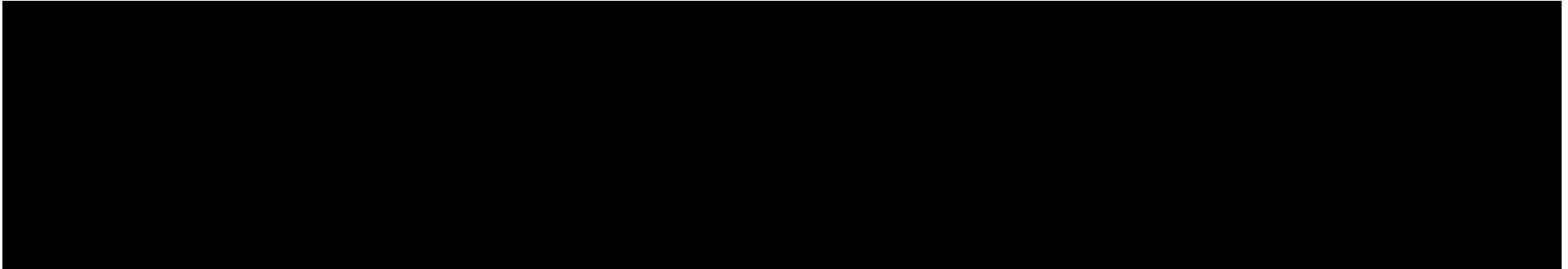
[1]: Table E.5.

[2]: Rosen Report I, Schedule 8: 0.75% of
initial capital expenditures in production
years 1 to 10; 0.80% in Years 11 to 30;
0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table E.8: Delayed Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



Sources & Notes:

[1]: Table E.5.

[2]: Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table E.8: Delayed Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**

Sources & Notes:

[1]: Table E.5.

[2]: Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table E.8: Delayed Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



Sources & Notes:

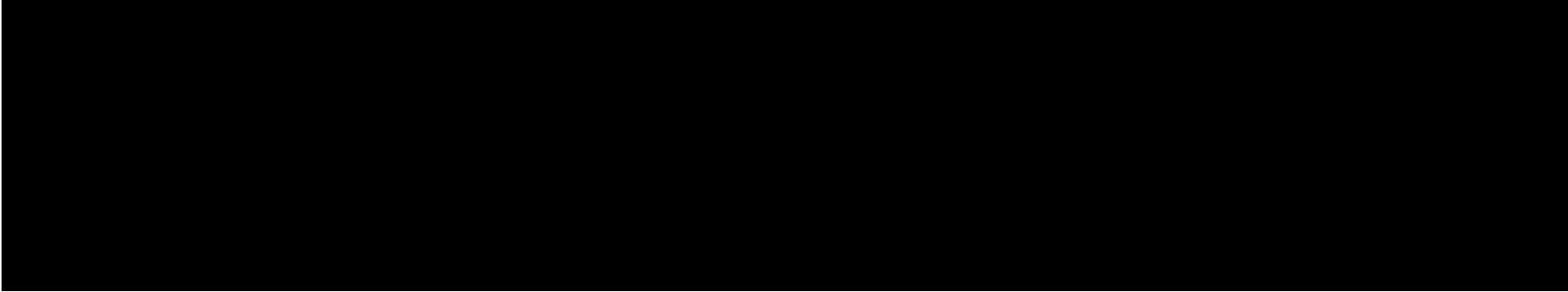
[1]: Table E.5.

[2]: Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table E.8: Delayed Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



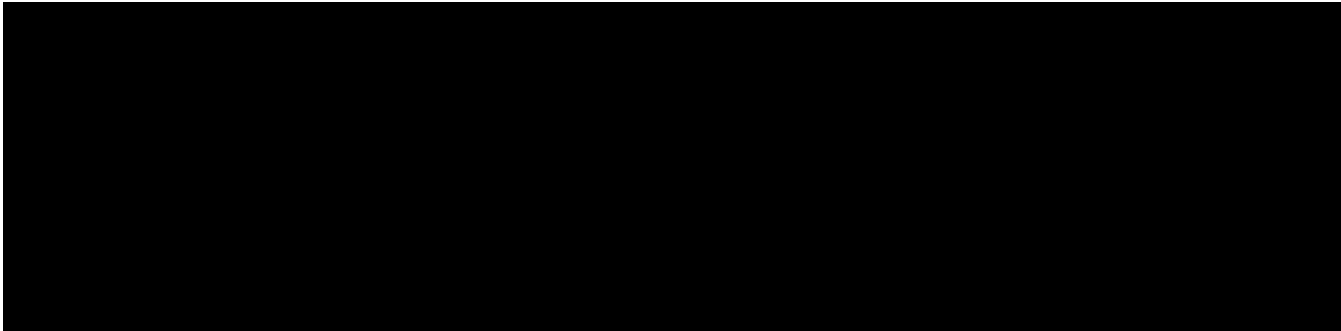
[1]: Table E.5.

[2]: Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

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**Table E.8: Delayed Brattle Schedule 8
Maintenance Costs - Marine Terminal
(Converted to 2007 US\$)**



Sources & Notes:

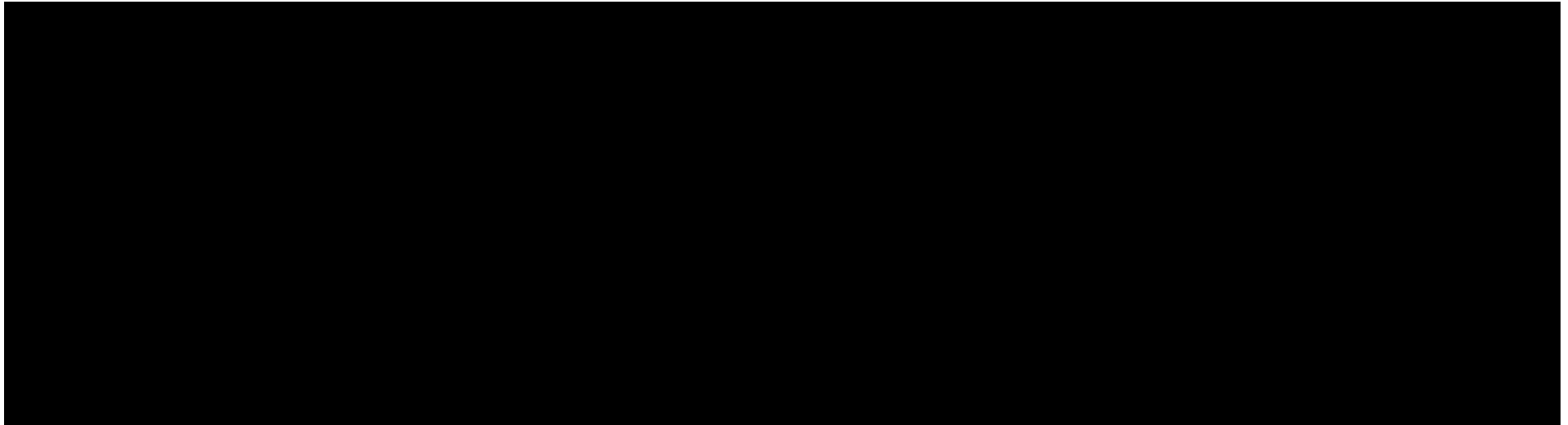
[1]: Table E.5.

[2]: Rosen Report I, Schedule 8: 0.75% of initial capital expenditures in production years 1 to 10; 0.80% in Years 11 to 30; 0.85% in years after.

[3]: See SCMA Rejoinder Report.

[4]: [2] x [3].

**Table E.9: Delayed Brattle Schedule 9
Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**



Sources & Notes:

[1]: Rosen Report I, Schedule 9, adjusted for the change in project life.

[2]: Rosen CPI (Bloomberg), Canadian CPI.

[3]: Nominal year in which values were reported in Rosen Report I.
There is no basis for Mr. Rosen's assumption.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from when [3] is 2007, multiplied by $1 / (1 + [2])^1$ using [2] from when [3] is 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from when [3] is 2009.

[5]: Table E.15.

[6]: $[1] / [5] \times [4]$.

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Reclamation and Decommissioning Costs
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Sources & Notes:

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[4]: $1 / (1 + [2])^{0.19}$ using [2] from when [3] is 2007, multiplied by $1 / (1 + [2])^1$ using [2] from when [3] is 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from when [3] is 2009.

[5]: Table E.15.

[6]: $[1] / [5] \times [4]$.

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[5]: Table E.15.

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[5]: Table E.15.

[6]: $[1] / [5] \times [4]$.

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Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**

Sources & Notes:

[1]: Rosen Report I, Schedule 9, adjusted for the change in project life.

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[3]: Nominal year in which values were reported in Rosen Report I.
There is no basis for Mr. Rosen's assumption.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from when [3] is 2007, multiplied by $1 / (1 + [2])^1$ using [2] from when [3] is 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from when [3] is 2009.

[5]: Table E.15.

[6]: $[1] / [5] \times [4]$.

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Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**



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[2]: Rosen CPI (Bloomberg), Canadian CPI.

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There is no basis for Mr. Rosen's assumption.

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[6]: $[1] / [5] \times [4]$.

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Reclamation and Decommissioning Costs
(Converted to 2007 US\$)**

Sources & Notes:

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[2]: Rosen CPI (Bloomberg), Canadian CPI.

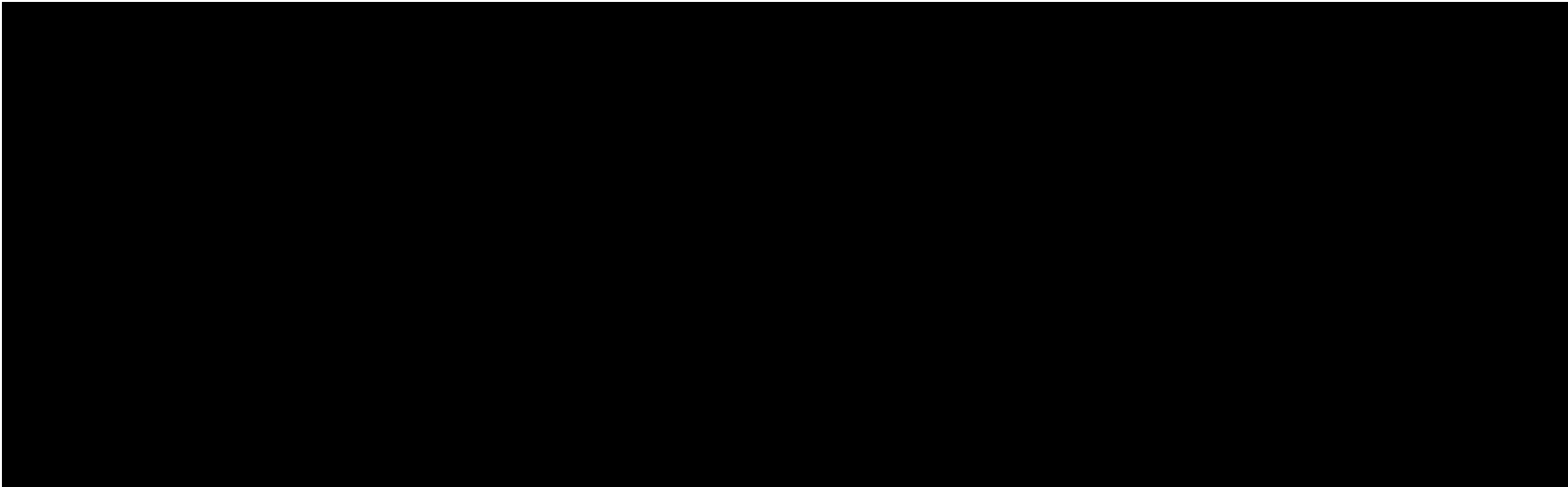
[3]: Nominal year in which values were reported in Rosen Report I.
There is no basis for Mr. Rosen's assumption.

[4]: $1 / (1 + [2])^{0.19}$ using [2] from when [3] is 2007, multiplied by $1 / (1 + [2])^1$ using [2] from when [3] is 2008, multiplied by $1 / (1 + [2])^{0.5}$ using [2] from when [3] is 2009.

[5]: Table E.15.

[6]: $[1] / [5] \times [4]$.

**Table E.9: Delayed Brattle Schedule 9
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(Converted to 2007 US\$)**



Sources & Notes:

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[2]: Rosen CPI (Bloomberg), Canadian CPI.

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[5]: Table E.15.

[6]: $[1] / [5] \times [4]$.

**Table E.10: Delayed Brattle Schedule 10
Interest Expense**

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Interest expense									
Existing debt	-	-	-	-	-	-	-	-	-
New debt	-	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-	-

Sources & Notes:

Interest expense is set to zero.

Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US\$ 2007)

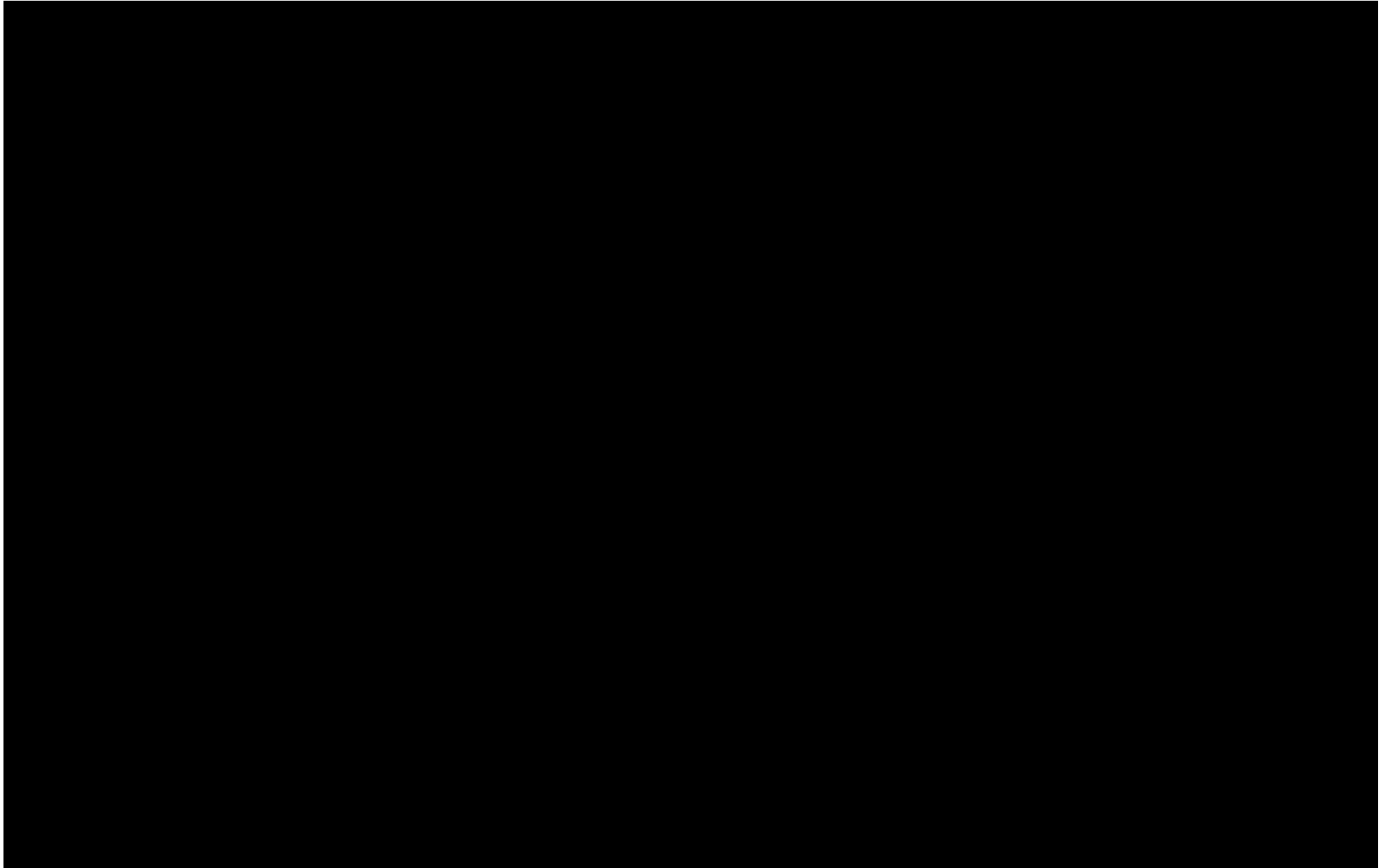


Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US\$ 2007)

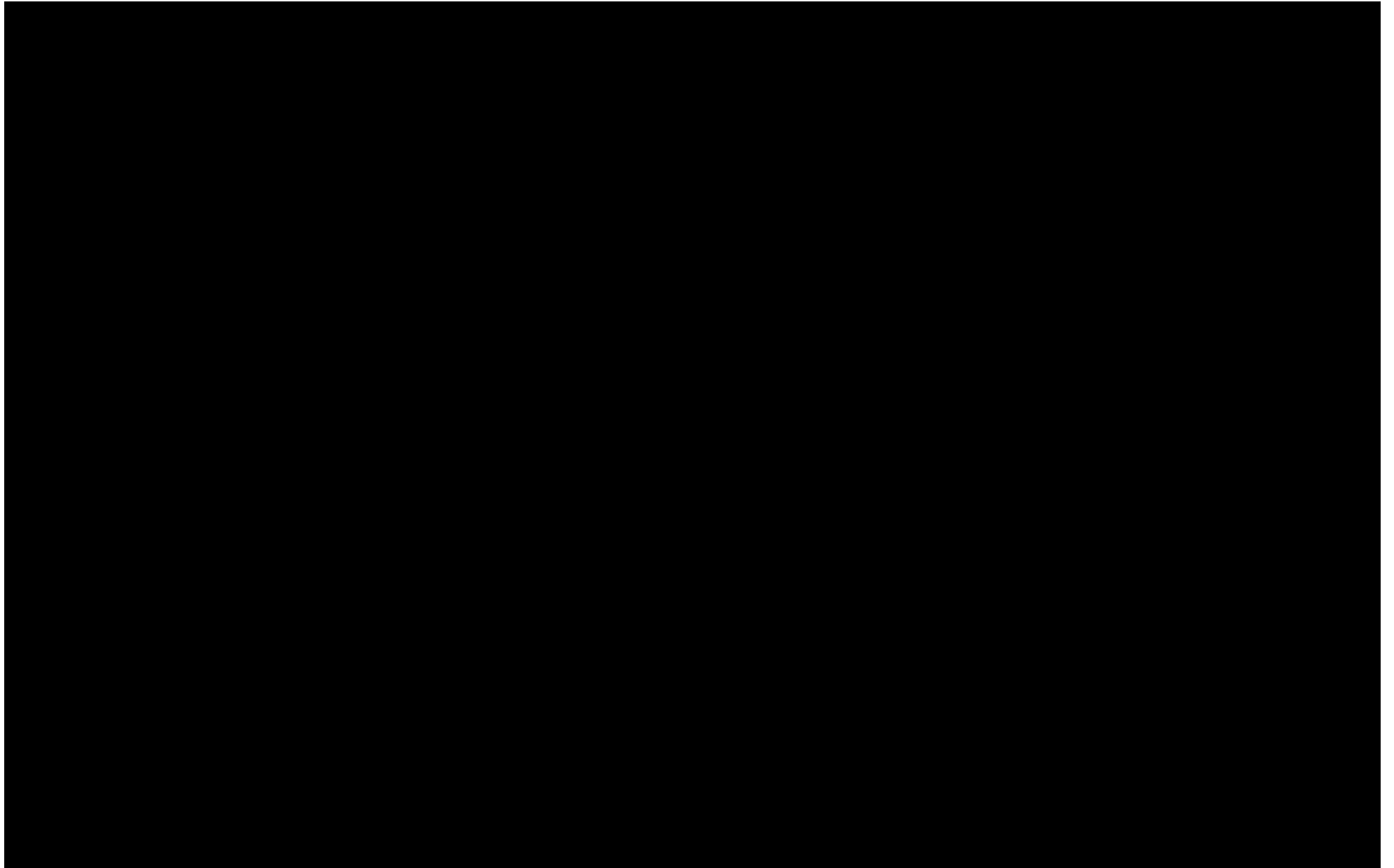


Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US\$ 2007)

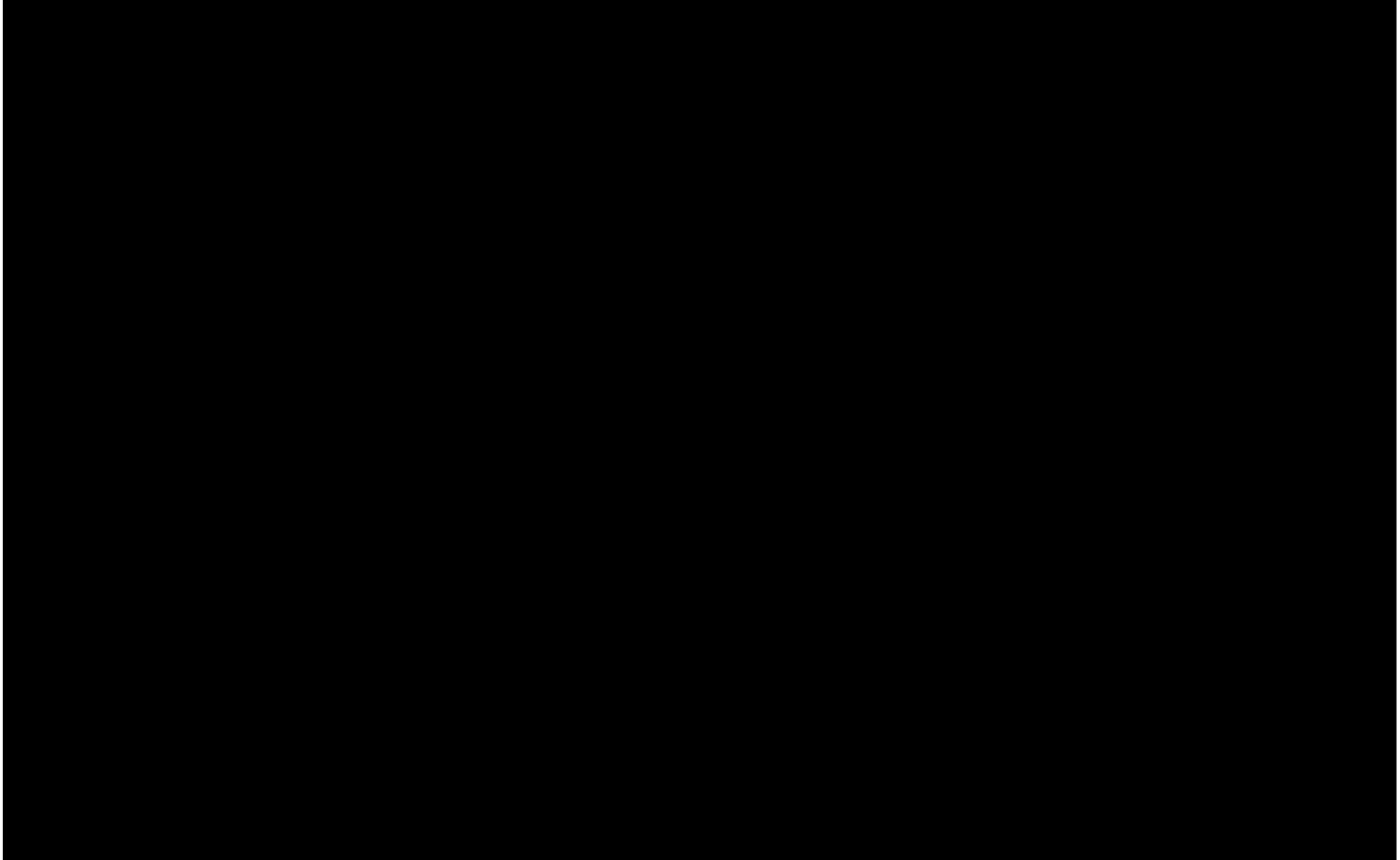


Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US\$ 2007)

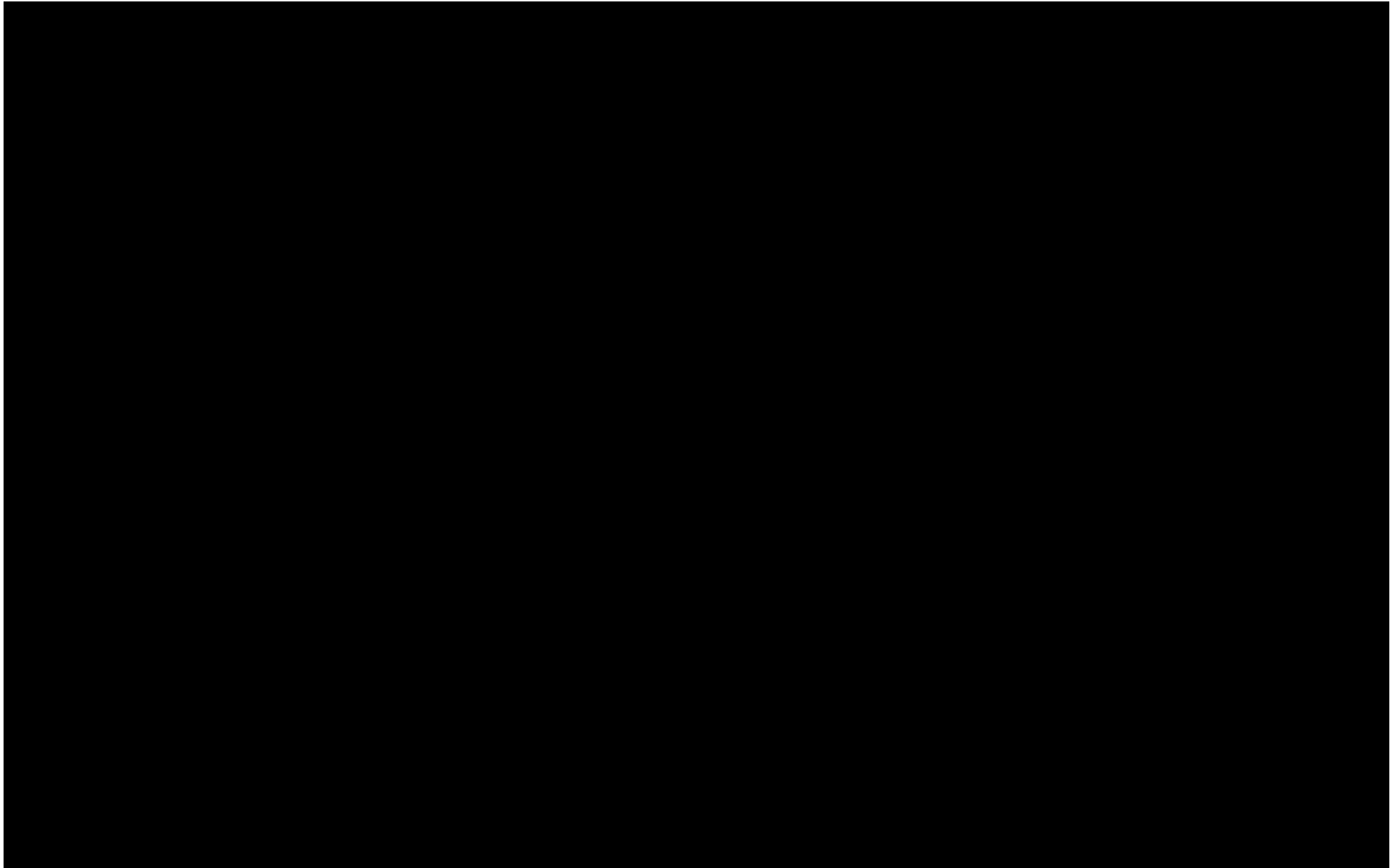
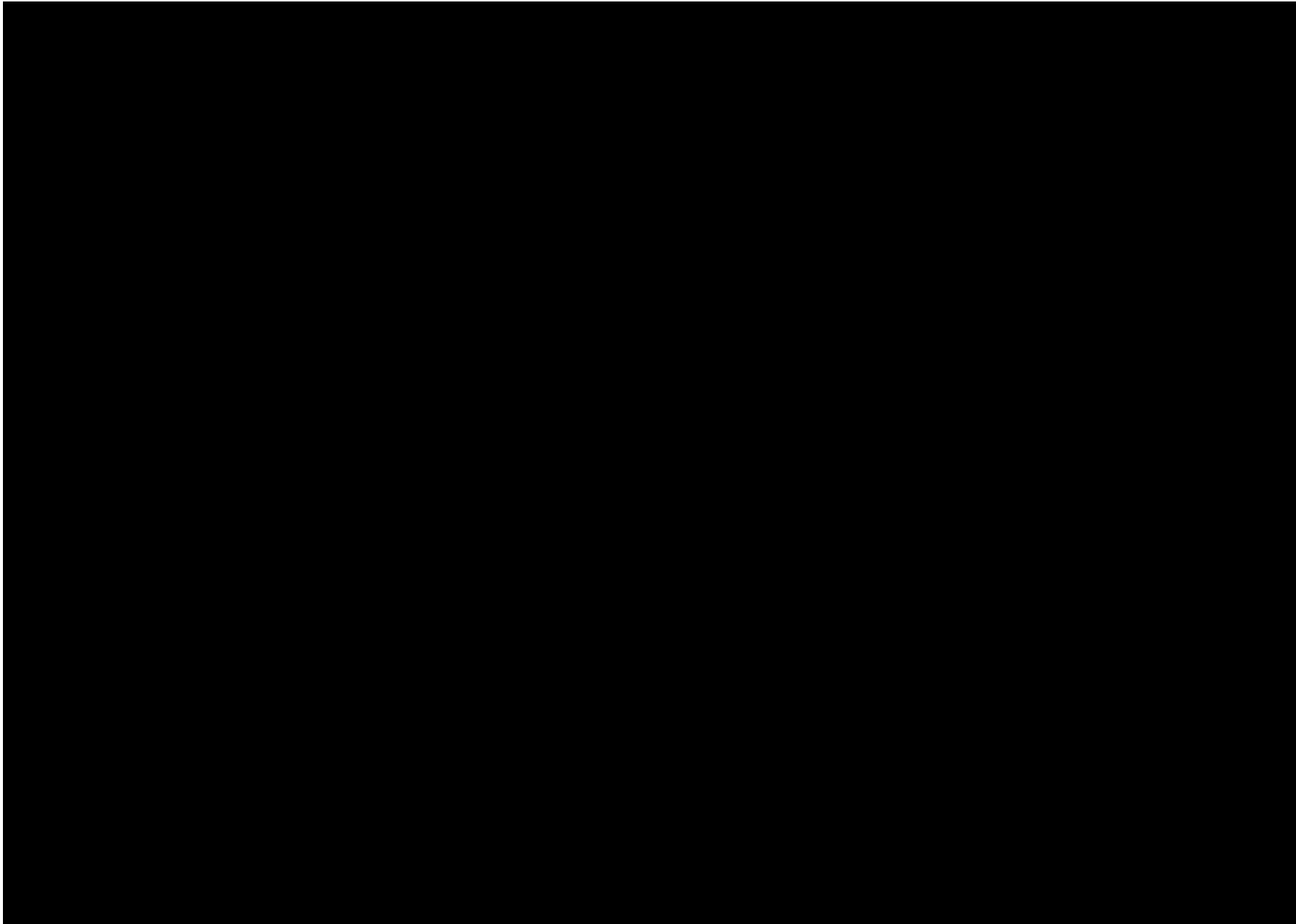


Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US\$ 2007)



**Table E.11: Delayed Brattle Schedule 11
Income Taxes
(US\$ 2007)**

Sources & Notes:

Tax calculations are adopted from Rosen Report I, Schedule 11.

Capital tax is converted to US\$ using Table E.15.

[1]: Table E.1.

[2]: Table E.1.

[3]: [1] + [2].

[4]: Cumulative of [3].

[5]: 31% in 2012-2016. Deloitte. Corporate Income Tax Rates (2012-2016).

[6]: Negative [11].

[7]: Rosen Report I, Schedule 11.

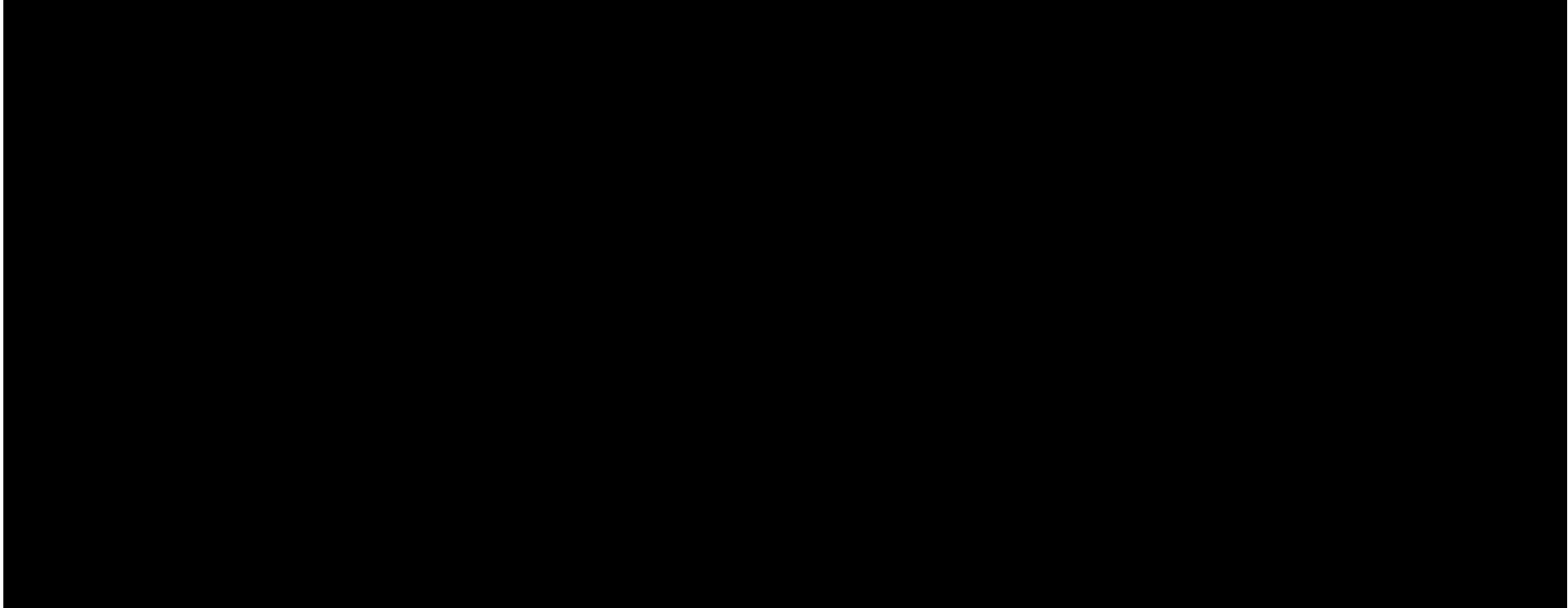
[8]: The sum of [5] through [7].

[9]: Taken from Table E.5.

[10]: Reclassified as CCA Class 14.1 beginning 1 January 2007.

Subject to CCA rate of 7% for the first 10 years and 5% thereafter. Source: Grant Thornton. New Rules for eligible property.

**Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
(\$US 2007)**



[1]: Table E.1.

[2]: Table E.1.

[3]: The sum of [2].

[4]: Days in each year. See Rosen Report I,
Schedule 12.

[5]: $[1] / [4] \times 30$.

[6]: $[3] / [4] \times 30$.

[7]: The sum of [5] and [6].

[8]: [7] from the current year, less [7]
from the previous year.

**Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
(\$US 2007)**

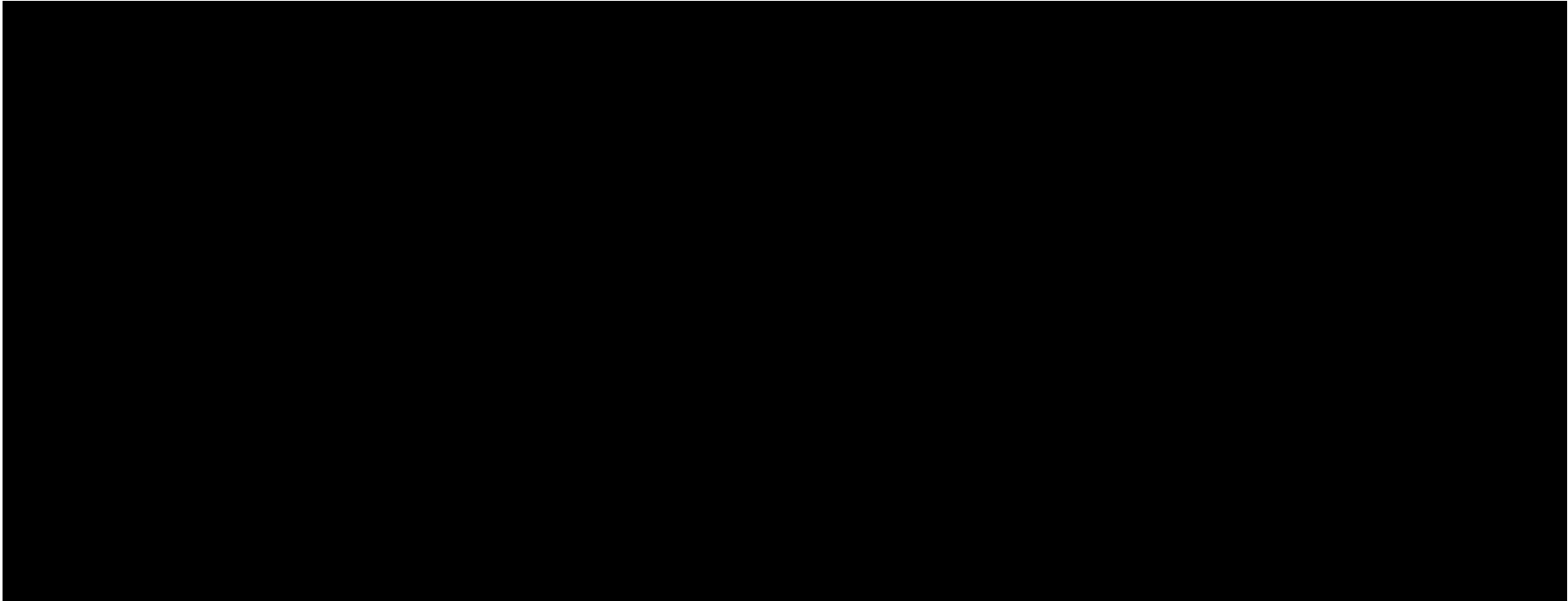
Sources & Notes:

- [1]: Table E.1.
- [2]: Table E.1.
- [3]: The sum of [2].
- [4]: Days in each year. See Rosen Report I, Schedule 12.
- [5]: $[1] / [4] \times 30$.
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- [7]: The sum of [5] and [6].
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Changes in Working Capital
(\$US 2007)**

- [1]: Table E.1.
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[3]: The sum of [2].
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[5]: $[1] / [4] \times 30$.
[6]: $[3] / [4] \times 30$.
[7]: The sum of [5] and [6].
[8]: [7] from the current year, less [7]
from the previous year.

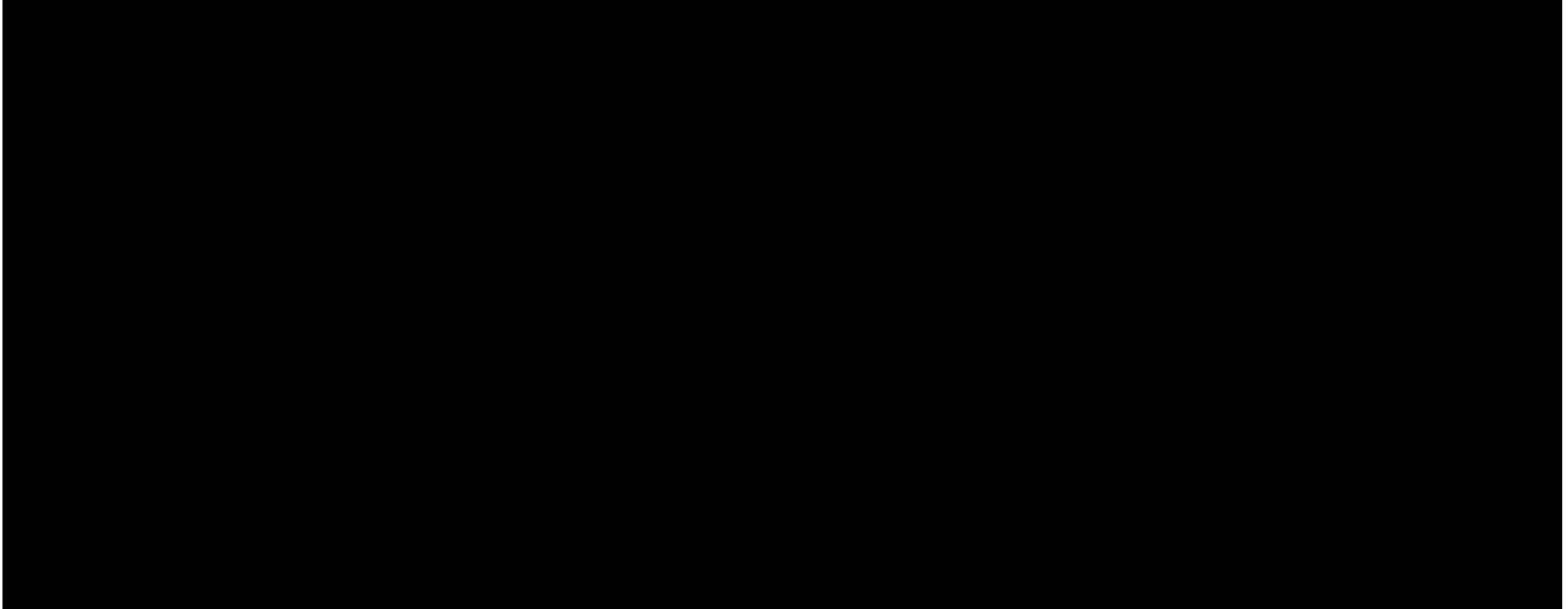
**Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
(\$US 2007)**



Sources & Notes:

- [1]: Table E.1.
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- [3]: The sum of [2].
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- [8]: [7] from the current year, less [7] from the previous year.

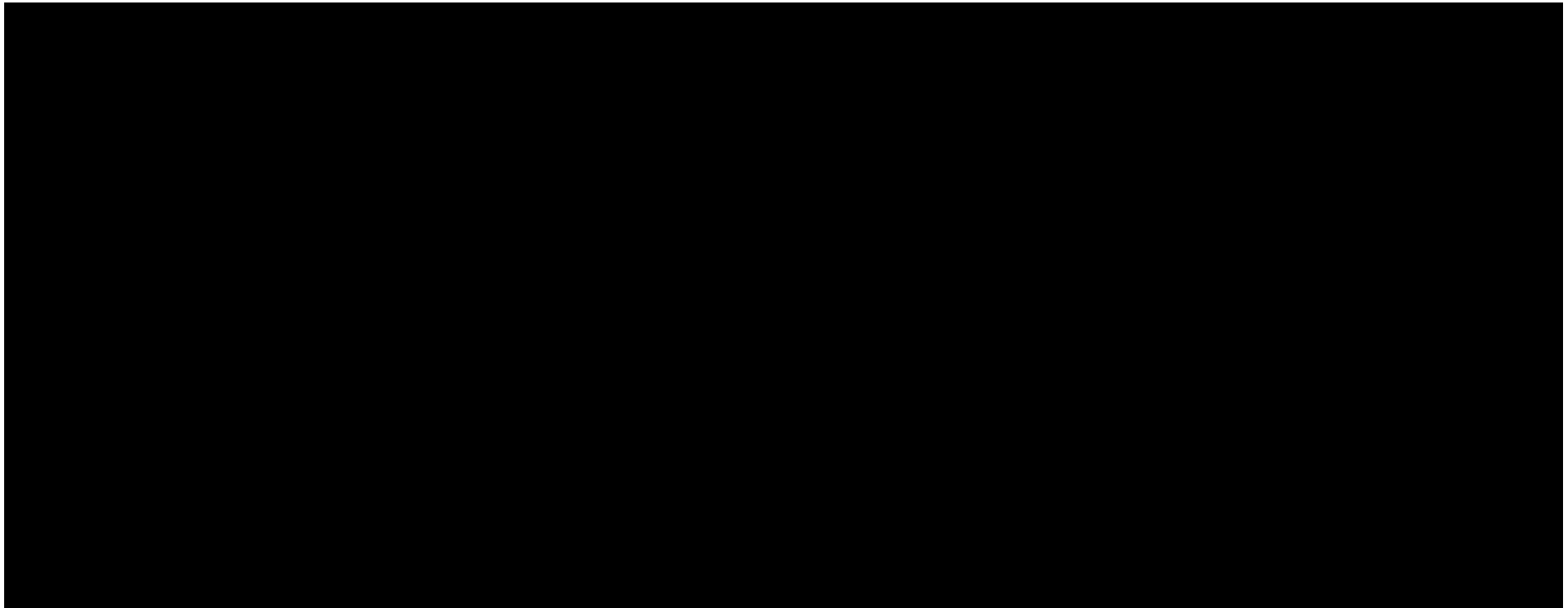
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(\$US 2007)**



Sources & Notes:

- [1]: Table E.1.
- [2]: Table E.1.
- [3]: The sum of [2].
- [4]: Days in each year. See Rosen Report I, Schedule 12.
- [5]: $[1] / [4] \times 30$.
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- [8]: [7] from the current year, less [7] from the previous year.

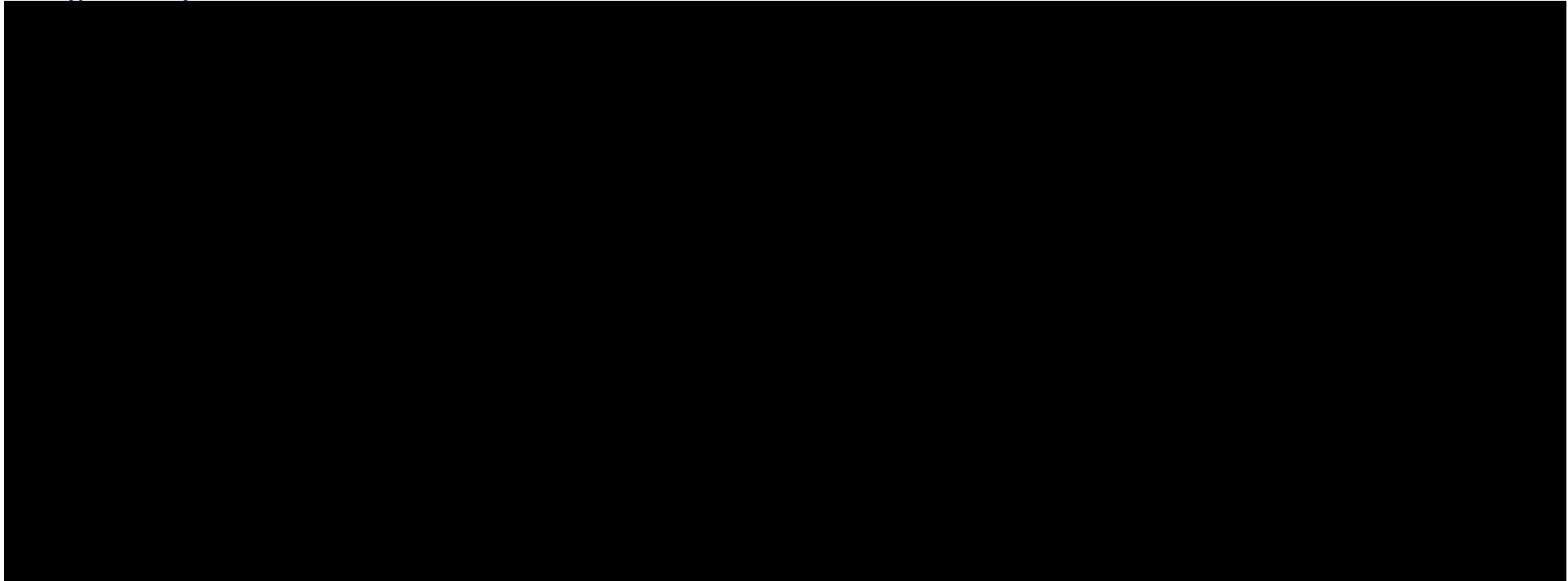
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- [1]: Table E.1.
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- [3]: The sum of [2].
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[3]: The sum of [2].

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[5]: $[1] / [4] \times 30$.

[6]: $[3] / [4] \times 30$.

[7]: The sum of [5] and [6].

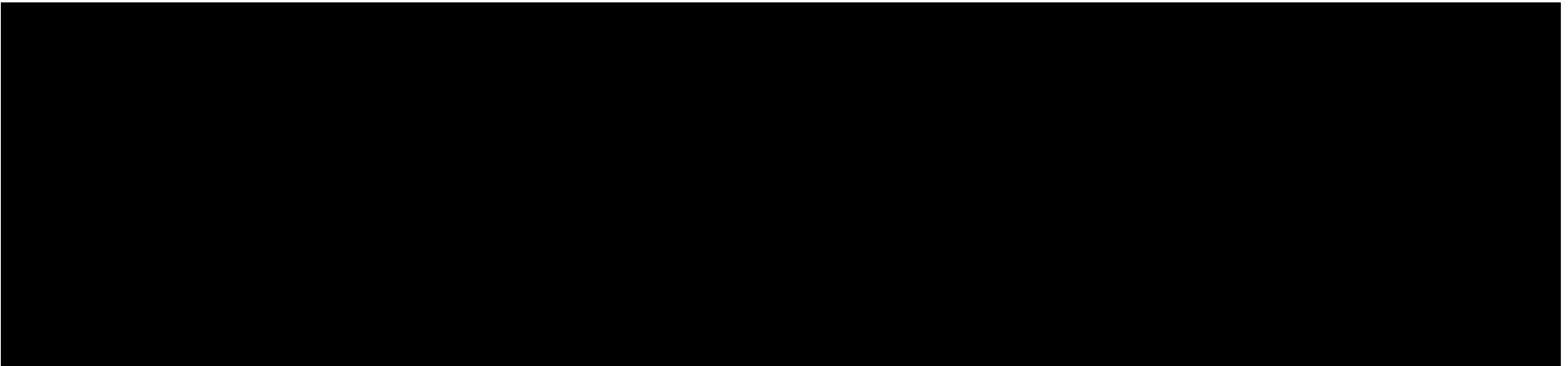
[8]: [7] from the current year, less [7]
from the previous year.

**Table E.12: Delayed Brattle Schedule 12
Changes in Working Capital
(\$US 2007)**

Sources & Notes:

- [1]: Table E.1.
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- [3]: The sum of [2].
- [4]: Days in each year. See Rosen Report I, Schedule 12.
- [5]: $[1] / [4] \times 30$.
- [6]: $[3] / [4] \times 30$.
- [7]: The sum of [5] and [6].
- [8]: [7] from the current year, less [7] from the previous year.

Table E.13: SCMA CIF Prices (2007 US\$)



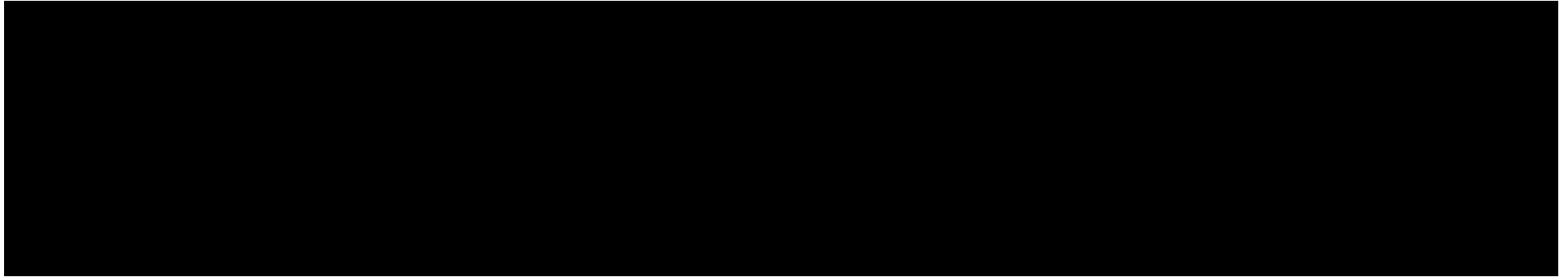
[1]: U.S. CPI, Bloomberg.

[2]: 1 over the product of $(1 + [1])^n$ using [1] from each year from 2007 through the current year, where n is 0.19 for 2007, n is 0.5 for the current year, and 1 for all years in-between. Years after 2016 are set to 2016 values.

[3]: SCMA Report I.

[4]: [2] x [3] for each specified location.

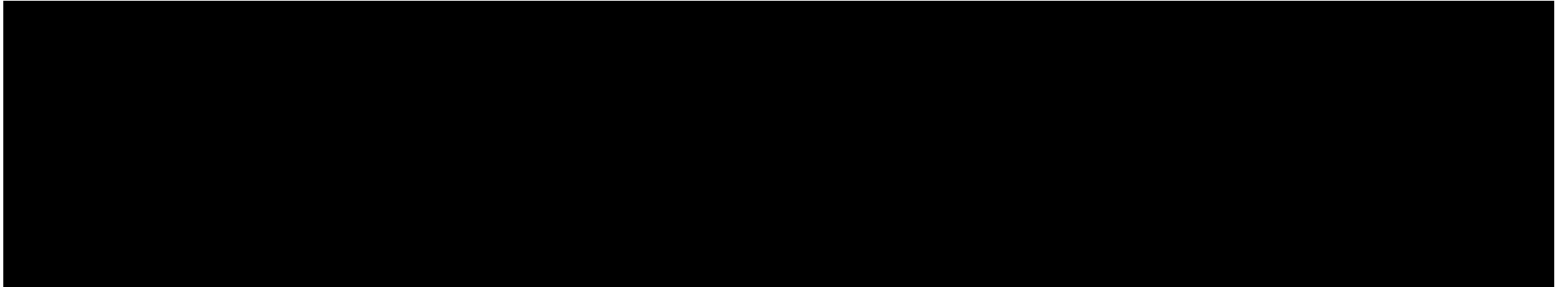
**Table E.14: Freight Costs
2007 (USD/Tonne)**



Source: Marsoft Rejoinder Report.

Note: Figures are deflated to 2007 values
using Marsoft's inflation rate of 2.3%.

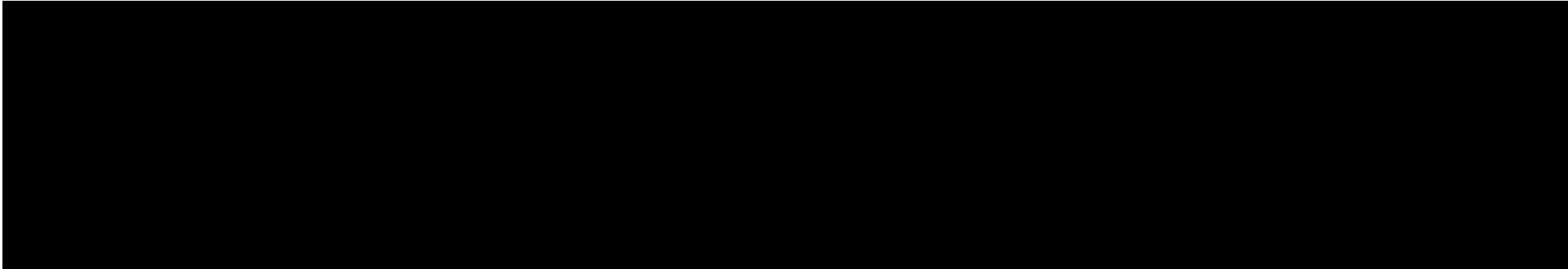
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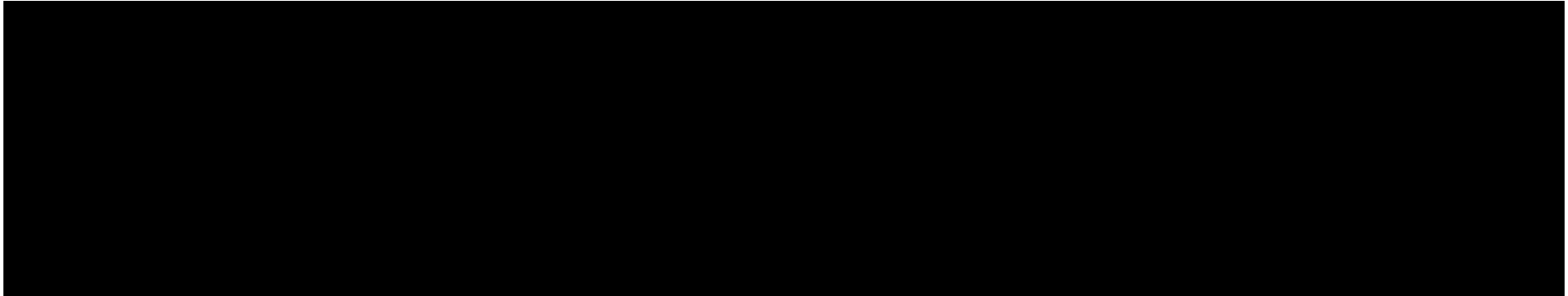
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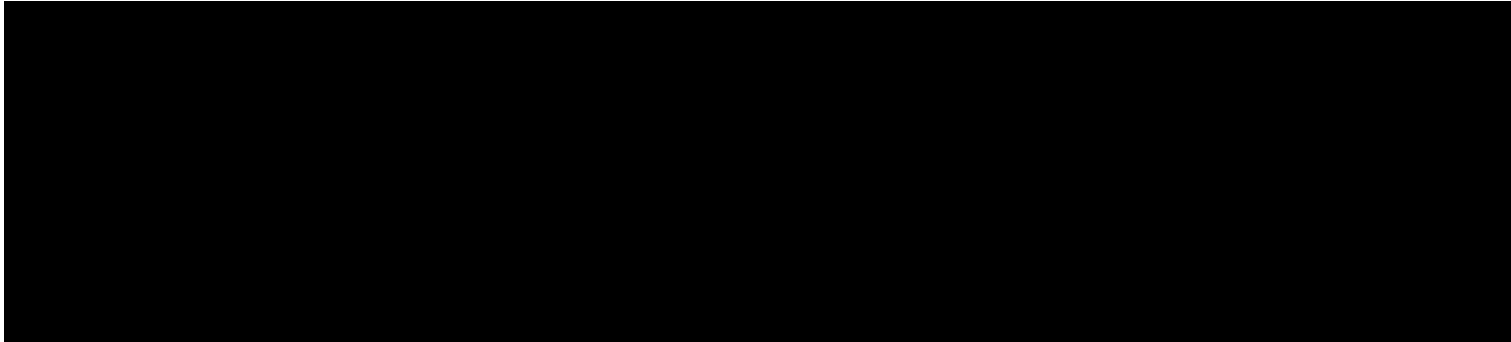
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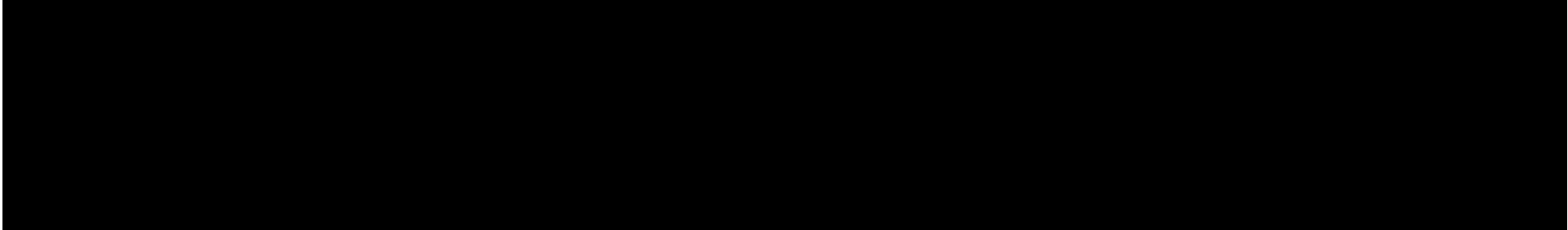
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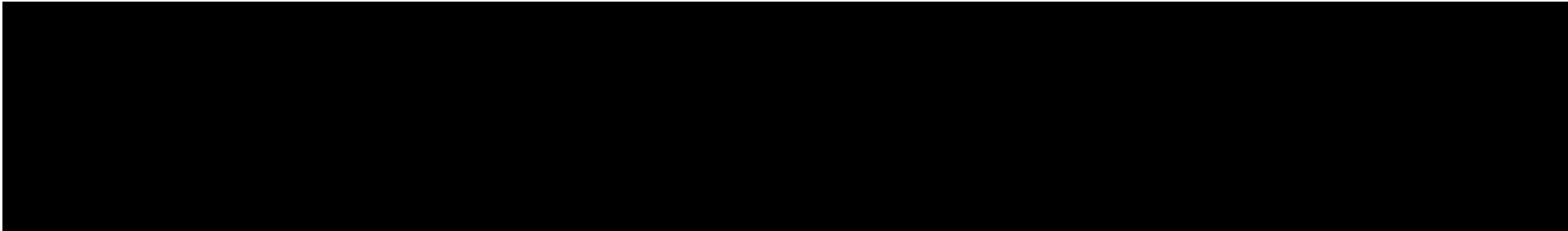
**Table E.15: Forward FX Rates
(October 2007)**



Sources & Notes:

- [1]: R-730, Bloomberg FX forward rates.
FX rates in years without forward rates are interpolated.
- [2]: [Year] - 2007.
- [3]: Years beyond 2037 are assigned the 30Y exchange rate.

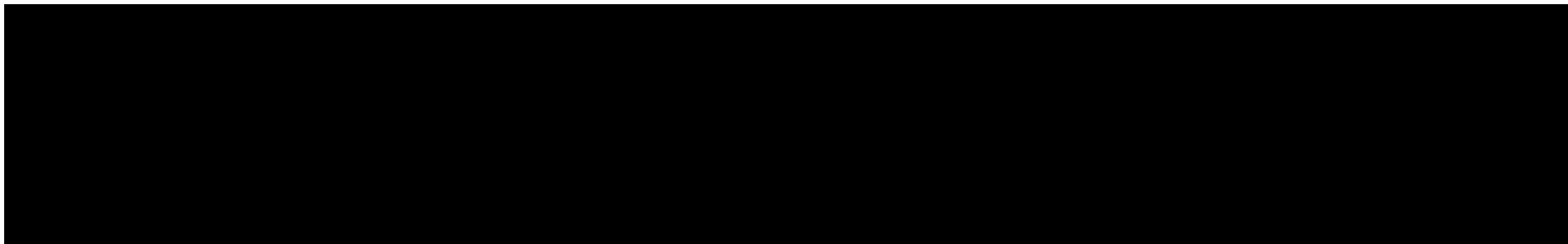
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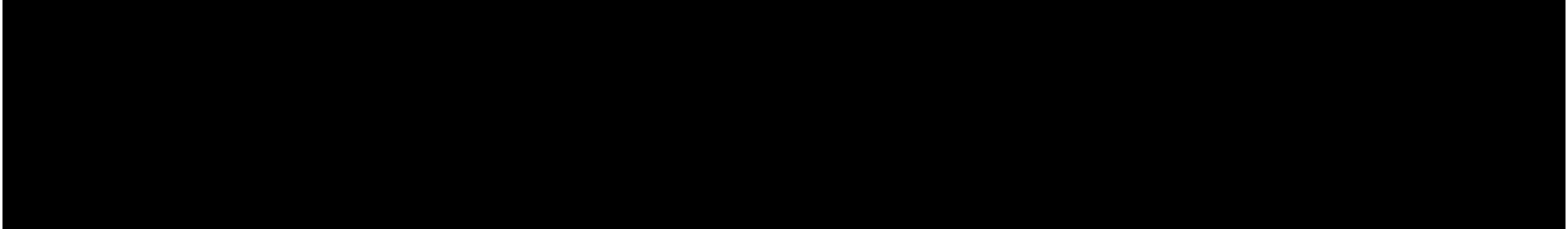
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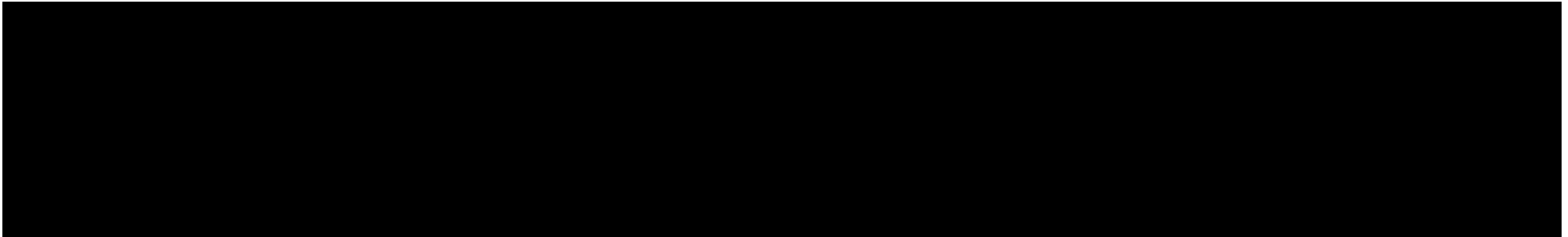
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FX rates in years without forward rates are interpolated.
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(October 2007)**



Sources & Notes:

- [1]: R-730, Bloomberg FX forward rates.
FX rates in years without forward rates are interpolated.
- [2]: [Year] - 2007.
- [3]: Years beyond 2037 are assigned the 30Y exchange rate.

Table E.16: Cost of Judicial Review

Calculation Step		Value
Judicial Review Costs (2017 C\$)	[1]	\$130,000
Inflation Adjustment Factor	[2]	0.8650
Judicial Review Costs (2007 C\$)	[3]	\$112,450
Exchange Rate (2007)	[4]	1.0734
Judicial Review Costs (2007 US\$)	[5]	\$104,756

Sources & Notes:

- [1]: I am instructed that the judicial review would cost between C\$105,000 and C\$130,000.
- [2]: $1 \text{ over the product of } (1 + \text{Canadian Inflation})^n$, using Canadian CPI (Bloomberg) from each year from 2007 through 2017, where n is 0.19 for 2007, 0.41 for 2017, and 1 for all years in-between.
- [3]: [1] x [2].
- [4]: C/US\$ foreign exchanges rates, Bloomberg.
- [5]: [3] / [4].

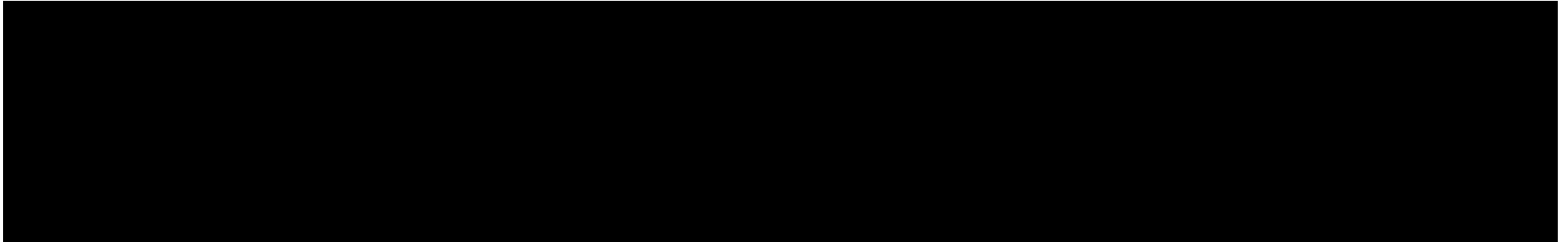
Appendix F: Market Data and Comparisons

**Table F.10: Inflation-Adjusted
Aggregate Prices per Ton
1950 - 2000**

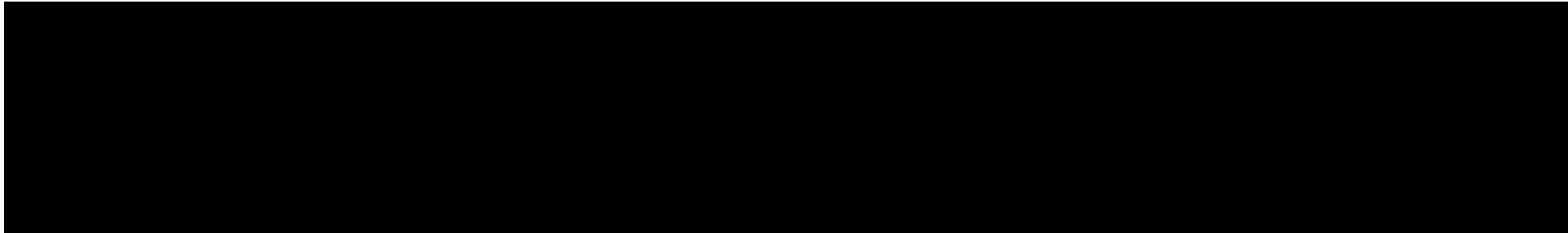
Year	Price in 1998 US\$ per ton
1950	10.10
1951	9.31
1952	9.33
1953	9.45
1954	8.97
1955	9.27
1956	9.16
1957	8.95
1958	8.70
1959	8.72
1960	8.52
1961	8.42
1962	8.38
1963	8.30
1964	8.47
1965	8.19
1966	7.99
1967	7.85
1968	7.70
1969	7.55
1970	7.81
1971	8.09
1972	7.78
1973	7.57
1974	7.22
1975	7.51
1976	7.42
1977	7.32
1978	7.28
1979	7.36
1980	6.79
1981	7.08
1982	6.88
1983	6.97
1984	6.80
1985	6.76
1986	6.83
1987	6.92
1988	6.76
1989	6.36
1990	6.29
1991	6.35
1992	6.18
1993	5.98
1994	5.92
1995	5.73
1996	5.61
1997	5.73
1998	5.38
1999	5.23
2000	5.08

Source: C-1152.

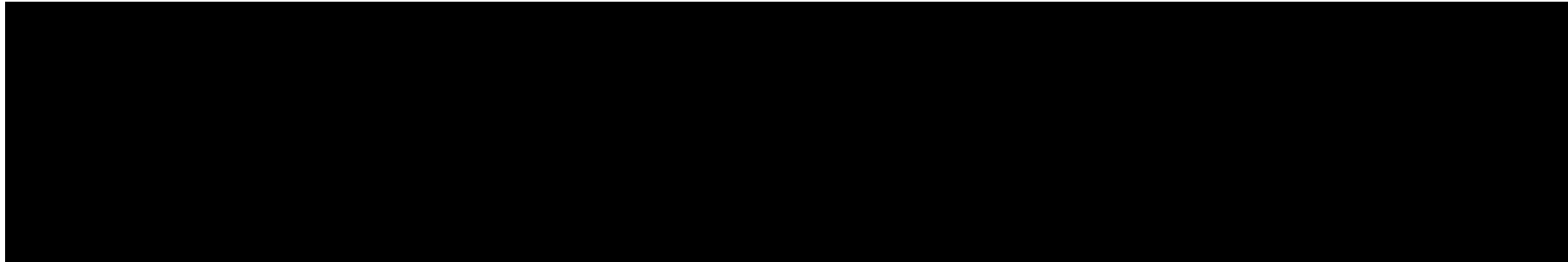
**Table F.11: EBITDA Margin
Martin Marietta and Vulcan Materials**



**Table F.11: EBITDA Margin
Martin Marietta and Vulcan Materials**

A large black rectangular redaction box covers the entire content area of the table, obscuring all data and headers.

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**Table F.11: EBITDA Margin
Martin Marietta and Vulcan Materials**

Source: Data from Compustat Research Insight, accessed 30 October 2017.

Note: EBITDA Margin is calculated as EBITDA / 'Sales-Net'.

**Table F.12: Whites Point Assumed Gross Margin vs. Brattle and Rosen's Comparables
and Clayton Companies' Financial Information
2001 - 2016**

Sources and Notes:

[1]: Rosen Reply Report, ¶15.53. Mr. Rosen claims [REDACTED] however this value is chosen to be conservative.

[2]: Rosen Report I, Schedule 1, C-1095. 'Gross Margin' / 'Total' of 'Revenues, net of freight.'

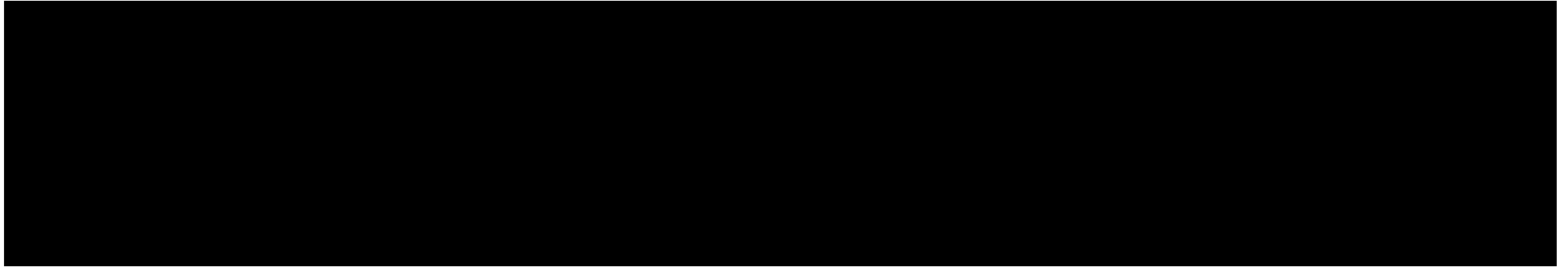
[3]: C-1447. Gross margin is calculated as ('Net Sales' - 'Cost of Sales') / 'Net Sales.'

[4]-[9]: Data from Compustat Research Insight, accessed 30 October 2017. Gross margin is calculated as ('Sales-Net' - 'Cost of Goods Sold') / 'Sales-Net.'

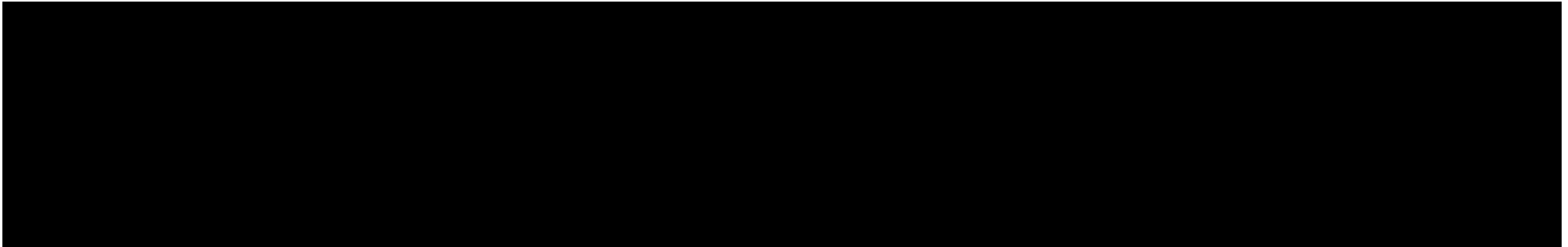
Figures reported for Eagle Materials in each year refer to the fiscal year beginning in March of that year.

See Rosen Report I at ¶A4.19 for his list of comparable companies.

**Table F.13: Gross Margin
Martin Marietta and Vulcan Materials**



**Table F.13: Gross Margin
Martin Marietta and Vulcan Materials**



**Table F.13: Gross Margin
Martin Marietta and Vulcan Materials**

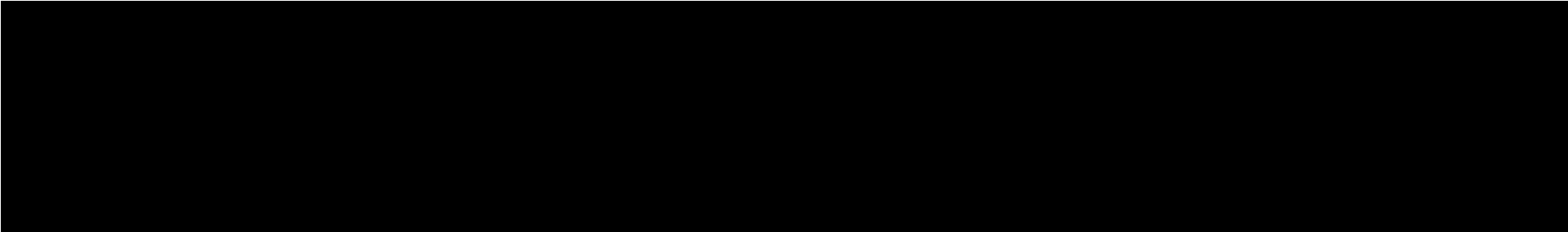


**Table F.13: Gross Margin
Martin Marietta and Vulcan Materials**

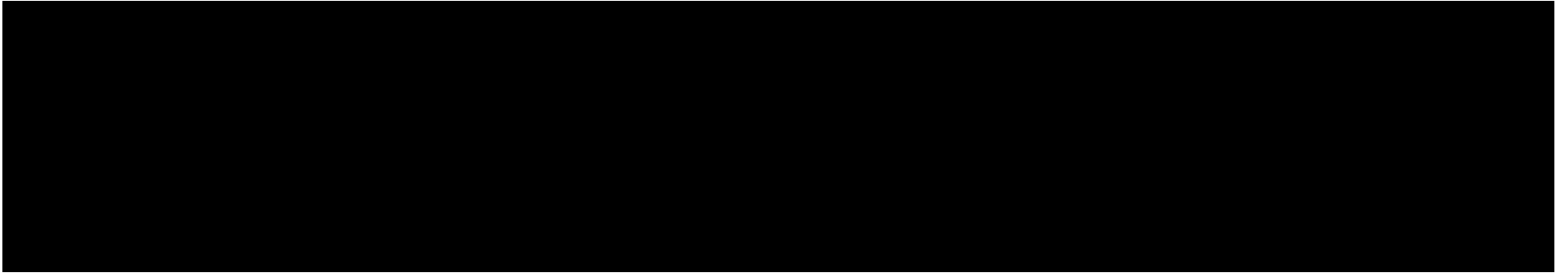
Source: Data from Compustat Research Insight, accessed 30 October 2017.

Note: Gross Margin is calculated as ('Sales-Net' minus 'Cost of Goods Sold') / 'Sales-Net.'

**Table F.14: Return on Investment
Martin Marietta vs. Seamen's Assumed Range**



**Table F.14: Return on Investment
Martin Marietta vs. Seamen's Assumed Range**

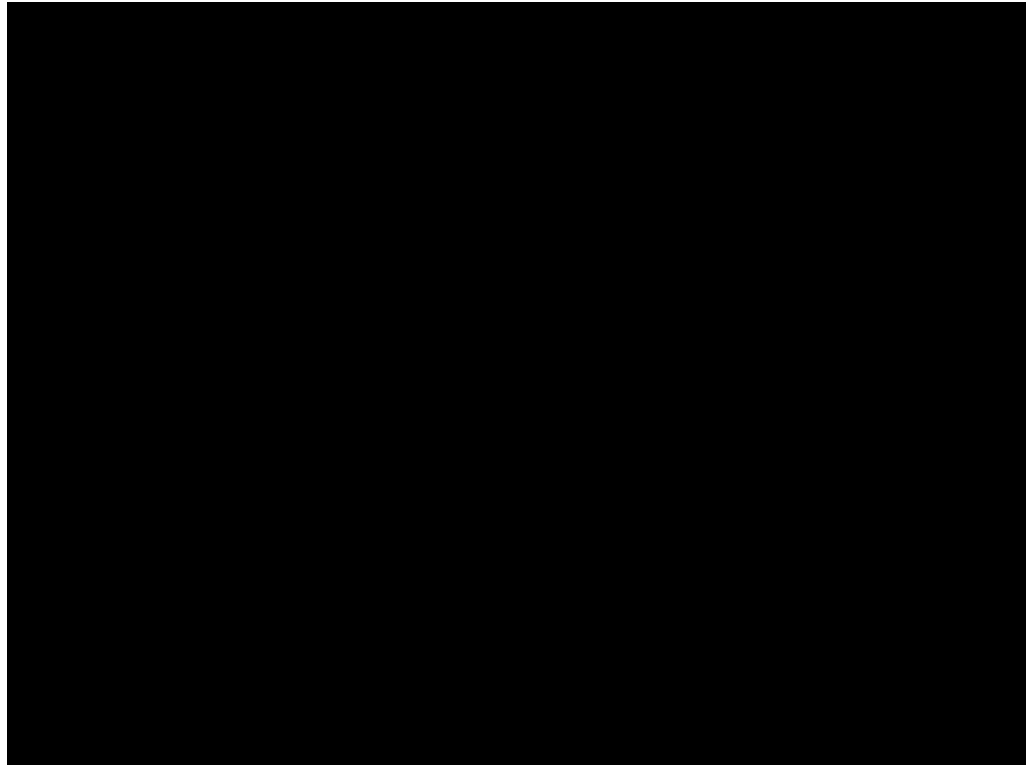


**Table F.14: Return on Investment
Martin Marietta vs. Seamen's Assumed Range**

Sources and Notes:

[1]: Data from Compustat Research Insight, accessed 30 October 2017. ROI values are reported directly and are calculated as Income Before Extraordinary Items minus Available for Common, divided by Total Invested Capital, which is the sum of the following items: Total Long-Term Debt; Preferred Stock; Minority Interest; and Total Common Equity.

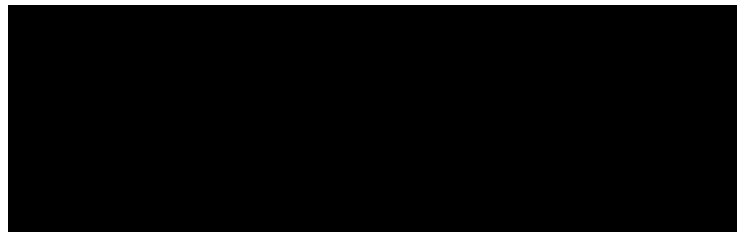
[2] & [3]: Seamen Report, p. 4. [2] is the lower bound of the range and [3] is the upper bound.



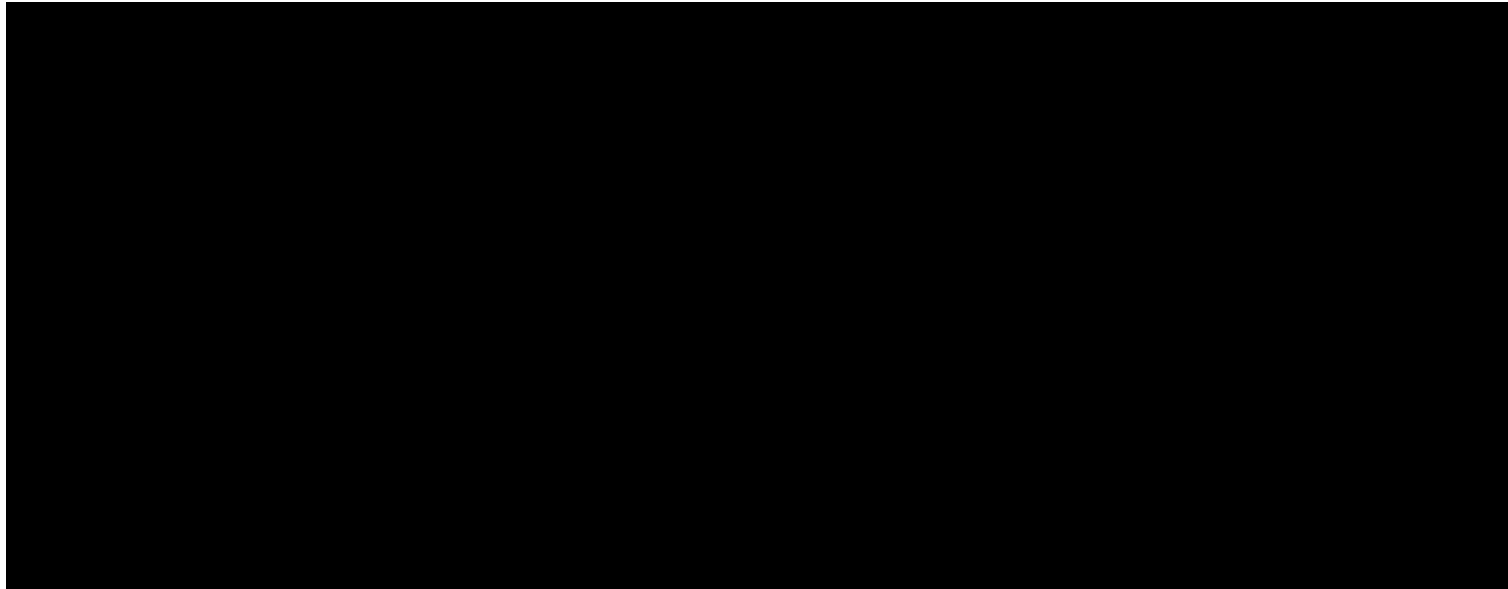
Source: Reply Witness Statement of Dan Fougere, Exhibit 2.

Notes:

[1]: 2017 refers to the half-year ending June 30, 2017.



**Table F.16: Aggregate Volumes
Claimed Whites Point Volume vs. Historical Figures
2010 - June 2017
(Short Tons)**



[1]: 2017 refers to the half-year ending June 30, 2017.

[2]: Rosen Report I, Figure 5.2. Claimed sales of aggregate from the Whites Point project [REDACTED]

[REDACTED] Refers to the sum of all materials listed, excluding grit.

[3]: Reply Witness Statement of Dan Fougere, Exhibit 2. [REDACTED]

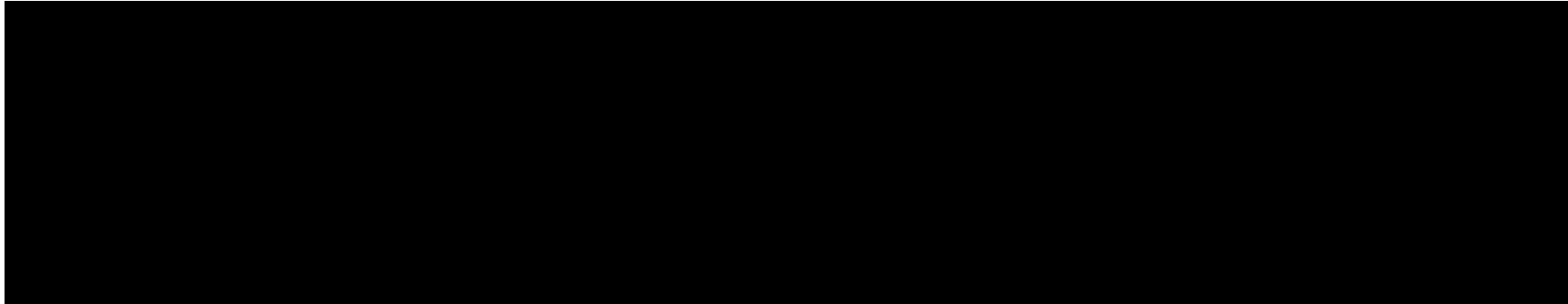
[REDACTED] Converted from metric to short tons using the reported conversion factor of 1.10231. See Chodorow Rejoinder Appendix F, Table F.15.

[REDACTED]

[REDACTED]

[REDACTED]

**Table F.17 Indexed Values for Whites Point
Using Total Returns of Vulcan Materials and Martin Marietta**



Sources & Notes:

Each value is indexed using the weighted average total return index of Vulcan Materials and Martin Marietta calculated in Chodorow Rejoinder Appendix F, Table F.21.

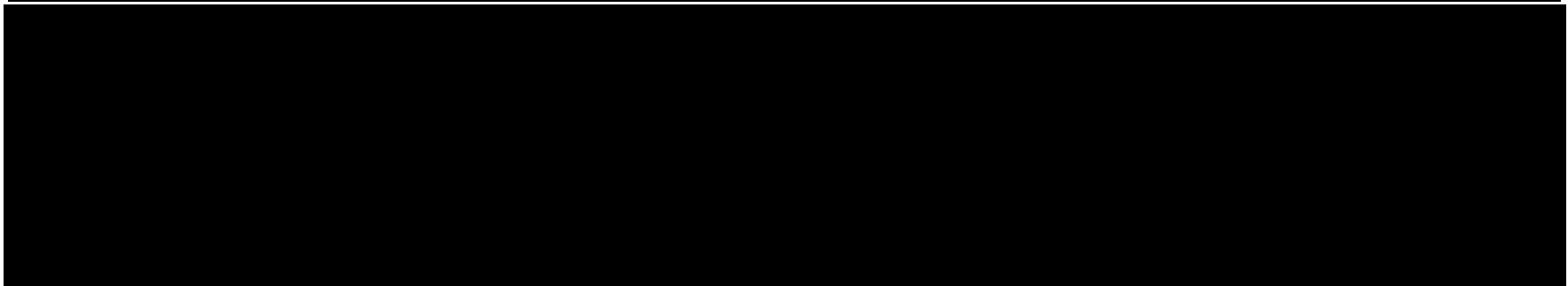
Each value's original date is assigned the end of the month during which it occurred.

Each value's initial value is rounded to the nearest dollar.

[1]-[3]: Chodorow Report I, Appendix F, Table F.3.

[4]: Rosen Reply Report, Figure 6.1.

**Table F.18 Indexed Values for Whites Point
Using Total Return of Martin Marietta**



Sources & Notes:

Each value is indexed using the total return index of Martin Marietta calculated in Chodorow Rejoinder Appendix F, Table F.21.

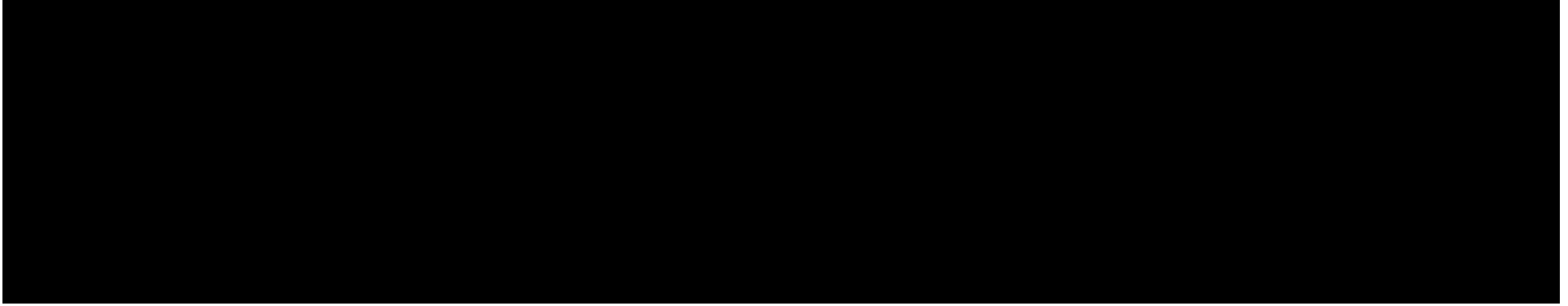
Each value's original date is assigned the end of the month during which it occurred.

Each value's initial value is rounded to the nearest dollar.

[1]-[3]: Chodorow Report I, Appendix F, Table F.3.

[4]: Rosen Reply Report, Figure 6.1.

**Table F.19 Indexed Values for Whites Point
Using Total Return of Vulcan Materials**



Each value is indexed using the total return index of Vulcan Materials calculated in Chodorow Rejoinder Appendix F, Table F.21.

Each value's original date is assigned the end of the month during which it occurred.

Each value's initial value is rounded to the nearest dollar.

[1]-[3]: Chodorow Report I, Appendix F, Table F.3.

[4]: Rosen Reply Report, Figure 6.1.

**Table F.20 Indexed Values for Whites Point
Using Implied Total Return of Rosen's Valuation of BNS**



Each value is indexed using the total return index calculated in Chodorow Rejoinder Appendix F, Table F.21.

Each value's original date is assigned the end of the month during which it occurred.

Each value's initial value is rounded to the neared dollar.

[1]-[3]: Chodorow Report I, Appendix F, Table F.3.

[4]: Rosen Reply Report, Figure 6.1.

Table F.21 Vulcan and Martin Marietta Historical Returns

Month	Vulcan				Martin Marietta				Weighted Average Total Return Index	Change in Total Return
	Stock Price	Quarterly Market Capitalization	Total Return Index	Change in Total Return	Stock Price	Quarterly Market Capitalization	Total Return Index	Change in Total Return		
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Dec-01	\$47.94	\$4,857.28	47.94	-	\$46.60	\$2,262.38	46.60	-	47.51	-
Jan-02	\$46.40	\$4,857.28	46.40	-3.21%	\$40.77	\$2,262.38	40.77	-12.51%	44.61	-6.11%
Feb-02	\$48.33	\$4,857.28	48.57	4.67%	\$41.75	\$2,262.38	41.89	2.75%	46.44	4.11%
Mar-02	\$47.54	\$4,821.55	47.77	-1.63%	\$42.22	\$2,051.01	42.36	1.13%	46.16	-0.62%
Apr-02	\$46.02	\$4,821.55	46.24	-3.20%	\$38.96	\$2,051.01	39.09	-7.72%	44.11	-4.44%
May-02	\$47.83	\$4,821.55	48.30	4.44%	\$40.00	\$2,051.01	40.28	3.03%	45.90	4.07%
Jun-02	\$43.80	\$4,445.39	44.23	-8.43%	\$39.00	\$1,903.94	39.27	-2.50%	42.74	-6.89%
Jul-02	\$40.44	\$4,445.39	40.84	-7.67%	\$38.33	\$1,903.94	38.59	-1.72%	40.16	-6.03%
Aug-02	\$39.02	\$4,445.39	39.64	-2.93%	\$36.64	\$1,903.94	37.04	-4.02%	38.86	-3.24%
Sep-02	\$36.16	\$3,670.96	36.73	-7.33%	\$32.57	\$1,590.10	32.93	-11.11%	35.58	-8.43%
Oct-02	\$33.56	\$3,670.96	34.09	-7.19%	\$27.84	\$1,590.10	28.15	-14.52%	32.30	-9.24%
Nov-02	\$37.74	\$3,670.96	38.58	13.16%	\$31.52	\$1,590.10	32.02	13.76%	36.60	13.31%
Dec-02	\$37.50	\$3,808.39	38.33	-0.64%	\$30.66	\$1,497.50	31.14	-2.73%	36.30	-0.80%
Jan-03	\$34.05	\$3,808.39	34.81	-9.20%	\$29.20	\$1,497.50	29.66	-4.76%	33.35	-8.13%
Feb-03	\$31.70	\$3,808.39	32.65	-6.18%	\$27.58	\$1,497.50	28.17	-5.03%	31.39	-5.89%
Mar-03	\$30.23	\$3,069.68	31.14	-4.64%	\$27.61	\$1,350.16	28.20	0.11%	30.24	-3.65%
Apr-03	\$34.97	\$3,069.68	36.02	15.68%	\$29.57	\$1,350.16	30.20	7.10%	34.24	13.24%
May-03	\$36.64	\$3,069.68	38.00	5.48%	\$34.21	\$1,350.16	35.12	16.30%	37.12	8.39%
Jun-03	\$37.07	\$3,766.61	38.44	1.17%	\$33.61	\$1,644.20	34.51	-1.75%	37.25	0.34%
Jul-03	\$40.22	\$3,766.61	41.71	8.50%	\$38.30	\$1,644.20	39.32	13.95%	40.98	10.03%
Aug-03	\$41.41	\$3,766.61	43.20	3.57%	\$38.23	\$1,644.20	39.44	0.29%	42.05	2.61%
Sep-03	\$39.91	\$4,058.81	41.63	-3.62%	\$36.45	\$1,783.50	37.60	-4.66%	40.40	-3.93%
Oct-03	\$44.31	\$4,058.81	46.22	11.03%	\$40.97	\$1,783.50	42.26	12.40%	45.01	11.42%
Nov-03	\$44.47	\$4,058.81	46.64	0.92%	\$42.57	\$1,783.50	44.10	4.34%	45.87	1.90%
Dec-03	\$47.57	\$4,843.15	49.90	6.97%	\$46.97	\$2,286.03	48.66	10.34%	49.50	7.92%
Jan-04	\$47.70	\$4,843.15	50.03	0.27%	\$46.00	\$2,286.03	47.65	-2.07%	49.27	-0.46%
Feb-04	\$47.30	\$4,843.15	49.89	-0.29%	\$49.09	\$2,286.03	51.04	7.11%	50.25	2.00%
Mar-04	\$47.44	\$4,843.81	50.03	0.29%	\$46.16	\$2,225.34	47.99	-5.97%	49.39	-1.72%
Apr-04	\$46.24	\$4,843.81	48.77	-2.53%	\$43.25	\$2,225.34	44.97	-6.30%	47.57	-3.68%
May-04	\$44.76	\$4,843.81	47.48	-2.64%	\$42.83	\$2,225.34	44.72	-0.56%	46.61	-2.02%
Jun-04	\$47.55	\$4,861.80	50.44	6.23%	\$44.33	\$2,137.80	46.28	3.50%	49.17	5.49%
Jul-04	\$47.62	\$4,861.80	50.51	0.15%	\$43.75	\$2,137.80	45.68	-1.31%	49.04	-0.27%
Aug-04	\$47.67	\$4,861.80	50.84	0.65%	\$44.99	\$2,137.80	47.18	3.29%	49.72	1.40%
Sep-04	\$50.95	\$5,217.69	54.34	6.88%	\$45.27	\$2,174.04	47.48	0.62%	52.32	5.22%
Oct-04	\$49.78	\$5,217.69	53.09	-2.30%	\$45.53	\$2,174.04	47.75	0.57%	51.52	-1.53%
Nov-04	\$51.85	\$5,217.69	55.58	4.68%	\$50.25	\$2,174.04	52.91	10.81%	54.79	6.35%
Dec-04	\$54.61	\$5,606.21	58.54	5.32%	\$53.66	\$2,538.44	56.50	6.79%	57.90	5.67%
Jan-05	\$56.48	\$5,606.21	60.54	3.42%	\$54.02	\$2,538.44	56.88	0.67%	59.40	2.59%
Feb-05	\$57.86	\$5,606.21	62.33	2.96%	\$57.68	\$2,538.44	60.94	7.15%	61.90	4.21%
Mar-05	\$56.83	\$5,803.40	61.22	-1.78%	\$55.92	\$2,606.44	59.08	-3.05%	60.56	-2.16%
Apr-05	\$53.04	\$5,803.40	57.14	-6.67%	\$54.99	\$2,606.44	58.10	-1.66%	57.44	-5.16%
May-05	\$59.93	\$5,803.40	64.87	13.54%	\$61.05	\$2,606.44	64.71	11.38%	64.82	12.86%
Jun-05	\$64.99	\$6,647.78	70.35	8.44%	\$69.12	\$3,200.46	73.27	13.22%	71.30	9.99%
Jul-05	\$70.24	\$6,647.78	76.03	8.08%	\$72.69	\$3,200.46	77.05	5.16%	76.36	7.11%
Aug-05	\$71.85	\$6,647.78	78.09	2.71%	\$72.32	\$3,200.46	76.90	-0.19%	77.70	1.76%
Sep-05	\$74.21	\$7,557.12	80.66	3.28%	\$78.46	\$3,637.68	83.43	8.49%	81.56	4.96%
Oct-05	\$65.00	\$7,557.12	70.65	-12.41%	\$78.91	\$3,637.68	83.91	0.57%	74.96	-8.09%
Nov-05	\$66.70	\$7,557.12	72.81	3.06%	\$75.11	\$3,637.68	80.11	-4.53%	75.18	0.30%
Dec-05	\$67.75	\$6,797.09	73.96	1.57%	\$76.72	\$3,508.18	81.83	2.14%	76.64	1.93%
Jan-06	\$71.88	\$6,797.09	78.46	6.10%	\$84.78	\$3,508.18	90.43	10.51%	82.54	7.70%
Feb-06	\$79.00	\$6,797.09	86.64	10.42%	\$97.50	\$3,508.18	104.24	15.27%	92.63	12.23%
Mar-06	\$86.65	\$8,717.70	95.03	9.68%	\$107.03	\$4,893.52	114.43	9.77%	102.00	10.12%
Apr-06	\$84.96	\$8,717.70	93.18	-1.95%	\$106.16	\$4,893.52	113.50	-0.81%	100.48	-1.49%
May-06	\$78.05	\$8,717.70	86.00	-7.70%	\$91.51	\$4,893.52	98.08	-13.58%	90.35	-10.09%
Jun-06	\$78.00	\$7,526.69	85.95	-0.06%	\$91.15	\$4,132.10	97.70	-0.39%	90.11	-0.26%
Jul-06	\$66.97	\$7,526.69	73.79	-14.14%	\$80.52	\$4,132.10	86.30	-11.66%	78.23	-13.19%
Aug-06	\$78.61	\$7,526.69	87.03	17.93%	\$82.36	\$4,132.10	88.57	2.63%	87.57	11.95%
Sep-06	\$78.25	\$7,388.65	86.63	-0.46%	\$84.62	\$3,817.29	91.00	2.74%	88.12	0.62%
Oct-06	\$81.48	\$7,388.65	90.21	4.13%	\$88.00	\$3,817.29	94.64	3.99%	91.71	4.08%
Nov-06	\$88.72	\$7,388.65	98.63	9.34%	\$99.31	\$3,817.29	107.09	13.16%	101.51	10.68%
Dec-06	\$89.87	\$8,502.24	99.91	1.30%	\$103.91	\$4,660.47	112.05	4.63%	104.21	2.66%
Jan-07	\$101.84	\$8,502.24	113.22	13.32%	\$115.42	\$4,660.47	124.47	11.08%	117.20	12.47%
Feb-07	\$116.65	\$8,502.24	130.19	14.99%	\$125.32	\$4,660.47	135.44	8.82%	132.05	12.67%
Mar-07	\$116.48	\$11,099.46	130.00	-0.15%	\$135.20	\$5,799.94	146.12	7.88%	135.53	2.64%
Apr-07	\$123.67	\$11,099.46	138.03	6.17%	\$145.82	\$5,799.94	157.59	7.86%	144.74	6.80%
May-07	\$119.69	\$11,099.46	134.10	-2.85%	\$155.44	\$5,799.94	168.29	6.79%	145.83	0.75%
Jun-07	\$114.54	\$10,944.34	128.33	-4.30%	\$162.02	\$6,771.14	175.41	4.23%	146.32	0.34%
Jul-07	\$95.72	\$10,944.34	107.24	-16.43%	\$137.00	\$6,771.14	148.32	-15.44%	122.94	-15.98%

Table F.21 Vulcan and Martin Marietta Historical Returns

Month	Vulcan				Martin Marietta				Weighted	
	Stock Price	Quarterly Market Capitalization	Total Return Index	Change in Total Return	Stock Price	Quarterly Market Capitalization	Total Return Index	Change in Total Return	Average Total Return Index	Change in Total Return
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Aug-07	\$90.01	\$10,944.34	101.36	-5.48%	\$135.00	\$6,771.14	146.53	-1.21%	118.63	-3.51%
Sep-07	\$89.15	\$8,521.90	100.39	-0.96%	\$133.55	\$5,590.14	144.96	-1.07%	118.05	-0.49%
Oct-07	\$85.51	\$8,521.90	96.29	-4.08%	\$129.35	\$5,590.14	140.40	-3.15%	113.76	-3.63%
Nov-07	\$88.80	\$8,521.90	100.52	4.38%	\$134.55	\$5,590.14	146.42	4.29%	118.70	4.34%
Dec-07	\$79.09	\$8,560.23	89.52	-10.93%	\$132.60	\$5,478.77	144.30	-1.45%	110.90	-6.57%
Jan-08	\$78.25	\$8,560.23	88.57	-1.06%	\$123.28	\$5,478.77	134.15	-7.03%	106.36	-4.09%
Feb-08	\$70.10	\$8,560.23	79.90	-9.79%	\$107.60	\$5,478.77	117.47	-12.44%	94.56	-11.09%
Mar-08	\$66.40	\$7,266.89	75.69	-5.28%	\$106.17	\$4,387.58	115.91	-1.33%	90.83	-3.95%
Apr-08	\$68.82	\$7,266.89	78.44	3.64%	\$109.38	\$4,387.58	119.41	3.02%	93.87	3.35%
May-08	\$76.93	\$7,266.89	88.25	12.50%	\$116.69	\$4,387.58	127.77	7.00%	103.12	9.86%
Jun-08	\$59.78	\$6,565.89	68.57	-22.29%	\$103.59	\$4,282.83	113.42	-11.23%	86.28	-16.33%
Jul-08	\$64.19	\$6,565.89	73.63	7.38%	\$104.97	\$4,282.83	114.93	1.33%	89.94	4.24%
Aug-08	\$74.84	\$6,565.89	86.41	17.35%	\$112.90	\$4,282.83	124.05	7.93%	101.27	12.60%
Sep-08	\$74.50	\$8,205.86	86.02	-0.45%	\$111.98	\$4,638.77	123.04	-0.81%	99.39	-1.86%
Oct-08	\$54.28	\$8,205.86	62.67	-27.14%	\$78.38	\$4,638.77	86.12	-30.00%	71.14	-28.42%
Nov-08	\$59.98	\$8,205.86	69.82	11.40%	\$87.64	\$4,638.77	96.74	12.32%	79.54	11.81%
Dec-08	\$69.58	\$7,672.59	80.99	16.01%	\$97.08	\$4,025.13	107.16	10.77%	90.00	13.15%
Jan-09	\$49.46	\$7,672.59	57.57	-28.92%	\$80.52	\$4,025.13	88.88	-17.06%	68.35	-24.06%
Feb-09	\$41.41	\$7,672.59	48.77	-15.29%	\$76.56	\$4,025.13	84.95	-4.42%	61.22	-10.42%
Mar-09	\$44.29	\$4,896.56	52.17	6.96%	\$79.30	\$3,530.28	87.99	3.58%	67.17	9.72%
Apr-09	\$47.55	\$4,896.56	56.01	7.36%	\$84.03	\$3,530.28	93.24	5.96%	71.60	6.59%
May-09	\$44.29	\$4,896.56	52.74	-5.82%	\$81.47	\$3,530.28	90.40	-3.05%	68.52	-4.31%
Jun-09	\$43.10	\$5,387.04	51.33	-2.69%	\$78.88	\$3,519.07	87.97	-2.69%	65.80	-3.96%
Jul-09	\$47.48	\$5,387.04	56.54	10.16%	\$86.07	\$3,519.07	95.99	9.11%	72.13	9.61%
Aug-09	\$50.04	\$5,387.04	59.89	5.92%	\$87.58	\$3,519.07	98.12	2.22%	74.99	3.97%
Sep-09	\$54.07	\$6,780.42	64.71	8.05%	\$92.07	\$4,109.64	103.15	5.13%	79.22	5.63%
Oct-09	\$46.03	\$6,780.42	55.09	-14.87%	\$83.32	\$4,109.64	93.34	-9.50%	69.53	-12.23%
Nov-09	\$48.48	\$6,780.42	58.32	5.87%	\$85.29	\$4,109.64	96.00	2.85%	72.54	4.34%
Dec-09	\$52.67	\$6,631.79	63.36	8.64%	\$89.41	\$4,059.12	100.64	4.83%	77.51	6.86%
Jan-10	\$44.19	\$6,631.79	53.16	-16.10%	\$79.18	\$4,059.12	89.12	-11.44%	66.81	-13.80%
Feb-10	\$43.41	\$6,631.79	52.52	-1.20%	\$79.22	\$4,059.12	89.62	0.56%	66.61	-0.31%
Mar-10	\$47.24	\$6,032.22	57.16	8.82%	\$83.55	\$3,793.42	94.52	5.47%	71.58	7.47%
Apr-10	\$57.28	\$6,032.22	69.30	21.25%	\$95.88	\$3,793.42	108.46	14.76%	84.42	17.94%
May-10	\$50.48	\$6,032.22	61.38	-11.44%	\$93.23	\$3,793.42	105.47	-2.76%	78.40	-7.13%
Jun-10	\$43.83	\$5,622.05	53.29	-13.17%	\$84.81	\$3,860.55	96.39	-8.60%	70.84	-9.64%
Jul-10	\$45.24	\$5,622.05	55.01	3.22%	\$85.40	\$3,860.55	97.06	0.70%	72.13	1.82%
Aug-10	\$36.76	\$5,622.05	45.00	-18.19%	\$73.20	\$3,860.55	83.65	-13.82%	60.74	-15.80%
Sep-10	\$36.92	\$4,740.20	45.20	0.44%	\$76.97	\$3,504.37	87.96	5.15%	63.37	4.34%
Oct-10	\$36.51	\$4,740.20	44.69	-1.11%	\$80.48	\$3,504.37	91.97	4.56%	64.79	2.23%
Nov-10	\$40.12	\$4,740.20	49.42	10.57%	\$84.54	\$3,504.37	97.07	5.54%	69.67	7.54%
Dec-10	\$44.36	\$5,703.37	54.64	10.57%	\$92.24	\$4,204.21	105.91	9.11%	76.40	9.65%
Jan-11	\$42.56	\$5,703.37	52.43	-4.06%	\$83.50	\$4,204.21	95.87	-9.48%	70.86	-7.24%
Feb-11	\$45.85	\$5,703.37	56.79	8.32%	\$88.86	\$4,204.21	102.49	6.90%	76.18	7.50%
Mar-11	\$45.60	\$5,887.28	56.48	-0.54%	\$89.67	\$4,087.97	103.42	0.91%	75.71	-0.61%
Apr-11	\$45.20	\$5,887.28	55.98	-0.88%	\$91.19	\$4,087.97	105.18	1.69%	76.14	0.56%
May-11	\$40.49	\$5,887.28	50.46	-9.87%	\$85.66	\$4,087.97	99.26	-5.63%	70.46	-7.47%
Jun-11	\$38.53	\$4,979.00	48.01	-4.84%	\$79.97	\$3,653.11	92.67	-6.64%	66.91	-5.03%
Jul-11	\$34.29	\$4,979.00	42.73	-11.00%	\$75.62	\$3,653.11	87.62	-5.44%	61.73	-7.74%
Aug-11	\$35.03	\$4,979.00	43.96	2.89%	\$70.83	\$3,653.11	82.54	-5.81%	60.29	-2.34%
Sep-11	\$27.56	\$3,561.66	34.59	-21.32%	\$63.22	\$2,888.96	73.67	-10.74%	52.09	-13.60%
Oct-11	\$31.29	\$3,561.66	39.27	13.53%	\$72.17	\$2,888.96	84.10	14.16%	59.35	13.93%
Nov-11	\$32.44	\$3,561.66	40.73	3.71%	\$78.26	\$2,888.96	91.66	8.99%	63.54	7.06%
Dec-11	\$39.35	\$5,085.79	49.40	21.30%	\$75.41	\$3,448.20	88.32	-3.64%	65.13	2.50%
Jan-12	\$43.86	\$5,085.79	55.06	11.46%	\$82.51	\$3,448.20	96.64	9.41%	71.86	10.34%
Feb-12	\$44.56	\$5,085.79	55.96	1.62%	\$85.87	\$3,448.20	101.04	4.56%	74.17	3.22%
Mar-12	\$42.73	\$5,528.80	53.66	-4.11%	\$85.63	\$3,916.89	100.76	-0.28%	73.19	-1.33%
Apr-12	\$42.81	\$5,528.80	53.76	0.19%	\$82.88	\$3,916.89	97.53	-3.21%	71.91	-1.75%
May-12	\$34.65	\$5,528.80	43.51	-19.06%	\$67.47	\$3,916.89	79.86	-18.11%	58.58	-18.53%
Jun-12	\$39.71	\$5,138.19	49.88	14.63%	\$78.82	\$3,612.95	93.30	16.82%	67.80	15.74%
Jul-12	\$38.74	\$5,138.19	48.66	-2.44%	\$75.14	\$3,612.95	88.94	-4.67%	65.29	-3.71%
Aug-12	\$38.92	\$5,138.19	48.90	0.49%	\$76.38	\$3,612.95	90.88	2.18%	66.23	1.44%
Sep-12	\$47.30	\$6,129.91	59.43	21.53%	\$82.87	\$3,804.40	98.61	8.50%	74.43	12.38%
Oct-12	\$45.97	\$6,129.91	57.76	-2.81%	\$82.31	\$3,804.40	97.94	-0.68%	73.14	-1.73%
Nov-12	\$52.84	\$6,129.91	66.40	14.96%	\$90.00	\$3,804.40	107.57	9.83%	82.16	12.33%
Dec-12	\$52.05	\$6,751.98	65.41	-1.49%	\$94.28	\$4,337.07	112.68	4.76%	83.90	2.11%
Jan-13	\$56.56	\$6,751.98	71.07	8.66%	\$98.73	\$4,337.07	118.00	4.72%	89.43	6.59%
Feb-13	\$50.93	\$6,751.98	64.01	-9.94%	\$97.13	\$4,337.07	116.56	-1.22%	84.57	-5.44%
Mar-13	\$51.70	\$6,718.52	64.98	1.51%	\$102.02	\$4,699.18	122.43	5.04%	88.62	4.80%

Table F.21 Vulcan and Martin Marietta Historical Returns

Month	Vulcan				Martin Marietta				Weighted	
	Stock Price	Quarterly Market Capitalization	Total Return Index	Change in Total Return	Stock Price	Quarterly Market Capitalization	Total Return Index	Change in Total Return	Average Total Return Index	Change in Total Return
[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Apr-13	\$49.88	\$6,718.52	62.69	-3.52%	\$100.99	\$4,699.18	121.20	-1.01%	86.77	-2.09%
May-13	\$53.58	\$6,718.52	67.35	7.44%	\$109.03	\$4,699.18	131.33	8.36%	93.68	7.97%
Jun-13	\$48.41	\$6,291.51	60.86	-9.65%	\$98.42	\$4,550.15	118.55	-9.73%	85.07	-9.20%
Jul-13	\$47.18	\$6,291.51	59.31	-2.54%	\$99.60	\$4,550.15	119.97	1.20%	84.77	-0.35%
Aug-13	\$47.80	\$6,291.51	60.10	1.34%	\$96.05	\$4,550.15	116.17	-3.16%	83.63	-1.34%
Sep-13	\$51.81	\$6,734.73	65.14	8.39%	\$98.17	\$4,540.17	118.74	2.21%	86.72	3.69%
Oct-13	\$53.55	\$6,734.73	67.33	3.36%	\$98.09	\$4,540.17	118.64	-0.08%	87.99	1.46%
Nov-13	\$56.37	\$6,734.73	70.89	5.29%	\$96.56	\$4,540.17	117.27	-1.15%	89.57	1.79%
Dec-13	\$59.42	\$7,736.48	74.72	5.41%	\$99.94	\$4,623.32	121.38	3.50%	92.18	2.91%
Jan-14	\$61.73	\$7,736.48	77.63	3.89%	\$109.01	\$4,623.32	132.39	9.07%	98.11	6.44%
Feb-14	\$67.93	\$7,736.48	85.49	10.13%	\$121.98	\$4,623.32	148.63	12.26%	109.11	11.21%
Mar-14	\$66.45	\$8,691.79	83.63	-2.18%	\$128.35	\$5,949.41	156.39	5.22%	113.20	3.75%
Apr-14	\$64.53	\$8,691.79	81.21	-2.89%	\$124.33	\$5,949.41	151.50	-3.13%	109.77	-3.03%
May-14	\$60.97	\$8,691.79	76.79	-5.44%	\$122.80	\$5,949.41	150.12	-0.91%	106.59	-2.90%
Jun-14	\$63.75	\$8,345.51	80.29	4.56%	\$132.05	\$6,126.46	161.43	7.53%	114.64	7.55%
Jul-14	\$63.13	\$8,345.51	79.51	-0.97%	\$124.23	\$6,126.46	151.87	-5.92%	110.14	-3.92%
Aug-14	\$63.38	\$8,345.51	79.90	0.49%	\$130.96	\$6,126.46	160.58	5.74%	114.06	3.55%
Sep-14	\$60.23	\$7,932.47	75.93	-4.97%	\$128.94	\$8,672.25	158.11	-1.54%	118.85	4.20%
Oct-14	\$61.71	\$7,932.47	77.80	2.46%	\$116.92	\$8,672.25	143.37	-9.32%	112.04	-5.73%
Nov-14	\$66.10	\$7,932.47	83.41	7.21%	\$120.04	\$8,672.25	147.68	3.01%	116.98	4.40%
Dec-14	\$65.73	\$8,670.25	82.94	-0.56%	\$110.32	\$7,423.76	135.73	-8.10%	107.29	-8.28%
Jan-15	\$70.51	\$8,670.25	88.97	7.27%	\$107.74	\$7,423.76	132.55	-2.34%	109.07	1.66%
Feb-15	\$83.00	\$8,670.25	104.86	17.86%	\$142.33	\$7,423.76	175.60	32.48%	137.49	26.05%
Mar-15	\$84.30	\$11,183.24	106.50	1.57%	\$139.80	\$9,433.01	172.48	-1.78%	136.69	-0.58%
Apr-15	\$85.52	\$11,183.24	108.04	1.45%	\$142.65	\$9,433.01	175.99	2.04%	139.13	1.79%
May-15	\$89.93	\$11,183.24	113.74	5.27%	\$149.01	\$9,433.01	184.33	4.74%	146.04	4.96%
Jun-15	\$83.93	\$11,161.35	106.15	-6.67%	\$141.51	\$8,986.59	175.06	-5.03%	136.89	-6.27%
Jul-15	\$91.02	\$11,161.35	115.12	8.45%	\$156.82	\$8,986.59	194.00	10.82%	150.30	9.80%
Aug-15	\$93.62	\$11,161.35	118.54	2.97%	\$167.80	\$8,986.59	208.07	7.26%	158.47	5.44%
Sep-15	\$89.20	\$11,891.70	112.94	-4.72%	\$151.95	\$10,049.97	188.42	-9.45%	147.51	-6.92%
Oct-15	\$96.58	\$11,891.70	122.28	8.27%	\$155.15	\$10,049.97	192.39	2.11%	154.39	4.67%
Nov-15	\$102.67	\$11,891.70	130.12	6.41%	\$157.40	\$10,049.97	195.67	1.71%	160.15	3.73%
Dec-15	\$94.97	\$12,647.34	120.36	-7.50%	\$136.58	\$8,806.54	169.79	-13.23%	140.65	-12.17%
Jan-16	\$88.20	\$12,647.34	111.78	-7.13%	\$125.58	\$8,806.54	156.12	-8.05%	129.98	-7.59%
Feb-16	\$98.53	\$12,647.34	125.13	11.94%	\$142.62	\$8,806.54	177.80	13.89%	146.75	12.90%
Mar-16	\$105.57	\$14,077.55	134.07	7.14%	\$159.51	\$10,129.68	198.85	11.84%	161.18	9.83%
Apr-16	\$107.63	\$14,077.55	136.68	1.95%	\$169.23	\$10,129.68	210.97	6.09%	167.77	4.09%
May-16	\$116.75	\$14,077.55	148.52	8.66%	\$189.04	\$10,129.68	236.16	11.94%	185.19	10.39%
Jun-16	\$120.36	\$16,011.13	153.11	3.09%	\$192.00	\$12,178.94	239.86	1.57%	190.59	2.91%
Jul-16	\$123.98	\$16,011.13	157.72	3.01%	\$202.65	\$12,178.94	253.17	5.55%	198.95	4.39%
Aug-16	\$113.87	\$16,011.13	145.11	-7.99%	\$183.03	\$12,178.94	229.18	-9.47%	181.43	-8.81%
Sep-16	\$113.73	\$15,047.50	144.93	-0.12%	\$179.11	\$11,367.40	224.27	-2.14%	179.07	-1.30%
Oct-16	\$113.20	\$15,047.50	144.26	-0.47%	\$185.38	\$11,367.40	232.12	3.50%	182.07	1.67%
Nov-16	\$125.65	\$15,047.50	160.38	11.17%	\$219.45	\$11,367.40	275.31	18.61%	209.84	15.25%
Dec-16	\$125.15	\$16,562.23	159.74	-0.40%	\$221.53	\$13,995.38	277.92	0.95%	213.86	1.92%

Source: R-747, Bloomberg, accessed 12 May 2017.

[1]: The month for which all other figures are reported.

[2] & [6] The closing price at the end of [1].

[3] & [7] Market capitalization (assumed at quarter end).

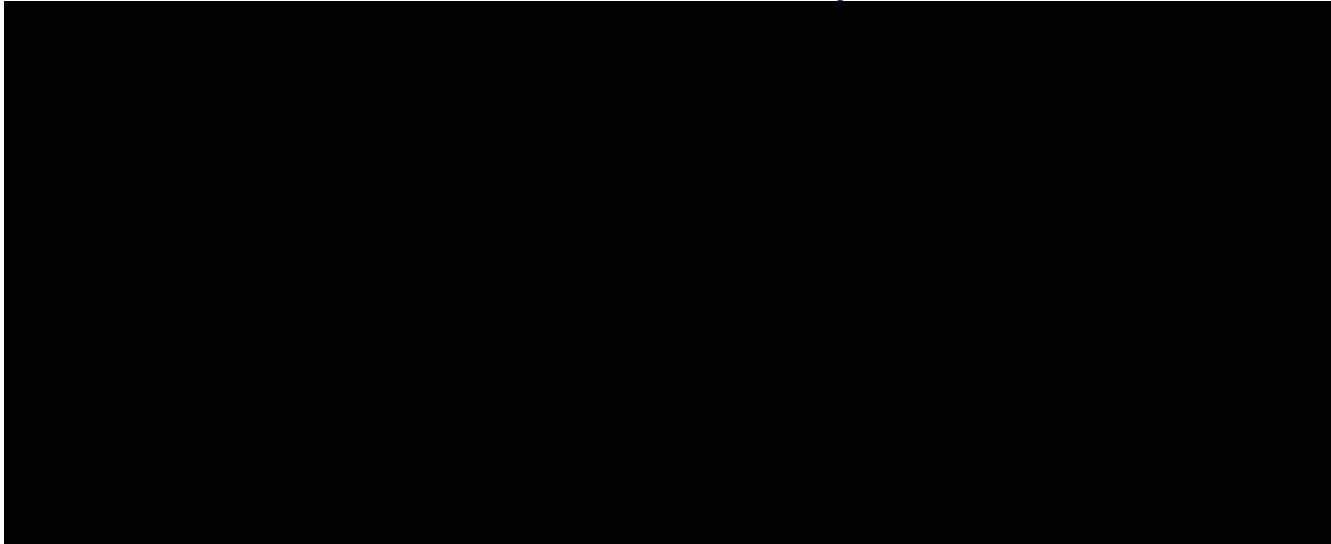
[4] & [8] Bloomberg Total Return Index (Gross Dividends) for each company.

[5] & [9]: The month over month change in the Total Return Index.

[10]: Total return index of Martin Marietta and Vulcan, weighted by market capitalization. $\left(\frac{[3]}{([3] + [7])} * [4]\right) + \left(\frac{[7]}{([3] + [7])} * [8]\right)$

[11]: The month over month change in [10].

**Table F.22: Corrected Pre-Award Interest Calculation
Rosen's Revised Analysis**



Total (\$378,824)

Sources & Notes:

[2]: Cash flows as stated in Rosen Reply Report, Schedule 13, C-1542.

[3]: Average 1-Year U.S. Constant Maturity Treasury Rate, as stated in Rosen Reply Report, Schedule 13, C-1542.

[4]: 100% plus the sum of [3] in all years after and including [1].

[5]: 100% plus the sum of [3] in all years after [1], multiplied by (1 plus [3] / 2).

[6]: [2] x ([5] - 1).

Appendix G: Volume Unit References in Select Project Description Documents

Volume Unit References in Select Project Description Documents

Date	Exhibit & Page	Document Title	Excerpt	Units	Descriptive Category
[1] 29 June 2007	C-290, p. 1	Response to Undertaking #32	"Total production per year ... 2,000,000 tons"	Tons	Production
[2] 26 June 2007	C-990, p. 14	Bilcon Project Description Presentation to the Joint Review Panel	"2 million tons of aggregate/year"	Tons	Production
[3] 26 June 2007	C-990, p. 82	Bilcon Project Description Presentation to the Joint Review Panel	"Typical vessel load ~45,000 tons"	Tons	Shipping
[4] 22 June 2007	C-445, p. 1	Bilcon's Response to Undertaking #12	"Stone price in New Jersey is \$6.23 - \$10.00 per ton USD, NYC is \$18.50 to \$19.00 per ton USD - FOB point of sale"	Tons	Other
[5] 3 April 2007	R-487, p. 10	Email from Josephine Lowry to Debra Myles with attached Bilcon's Responses to the Panel's Information Requests of February 27th, 2007	"Displacement tonnages of the vessels are typically in the 60,000 to 75,000 tonne range."	Tonnes	Shipping
[6] 12 February 2007	C-629, p. 304	Bilcon's Responses to Comments on the EIS - Vol II - Cover Page	"100 million tons of basalt rock"	Tons	Production
[7] 12 February 2007	C-629, p. 367	Bilcon's Responses to Comments on the EIS - Vol II - Cover Page	"Bilcon has leased 150 hectares of land and, at a production rate of 2 million tonnes per year, anticipates a quarry life of 50 years."	Tonnes	Production
[8] 12 February 2007	C-635, p. 50	Bilcon's Responses to Comments on the EIS - Vol III- EIS, 9.1.1 - Climate	"The MVCI 2005 study does not provide empirical evidence defined as 'based on actual observations' since it is not possible to test mine 100 million tons."	Tons	Production
[9] 12 February 2007	C-637, p. 170	Bilcon's Responses to Comments on the EIS - Vol. III—Comments on the EIS-EIS, 9.3.6.2 Analysis	"The MVCI 2005 study does not provide empirical evidence defined as 'based on actual observations' since it is not possible to test mine 100 million tons."	Tons	Production
[10] 12 February 2007	C-629, p. 367	Bilcon's Responses to Comments on the EIS - Vol II - Cover Page	"Shipment of crushed product is anticipated to be approximately 40,000 tonnes per week, though this will vary with ship availability and weather conditions."	Tonnes	Shipping
[11] 12 February 2007	C-639, p. 126	Bilcon's Responses to Comments on the EIS - Vol IV- EIS, 12.0	"Year-round extraction and processing activities are expected to take place on 300 acres of land, with approximately 40,000 tonnes of aggregate produced for ship loading each week, totaling two million tonnes per year."	Tonnes	Shipping
[12] 10 January 2007	R-330, p. 4	Presentation of Bilcon of Nova Scotia Corporation to Various Ministers of the Government of Nova Scotia	"Annual production of aggregate products is planned to be 2 million tonnes."	Tonnes	Production

Volume Unit References in Select Project Description Documents

Date	Exhibit & Page	Document Title	Excerpt	Units	Descriptive Category
[13] 10 January 2007	R-330, p. 3	Presentation of Bilcon of Nova Scotia Corporation to Various Ministers of the Government of Nova Scotia	"Water based infrastructure and activities will include the ship loading of approximately 40,000 tons of aggregate weekly."	Tons	Shipping
[14] November 2006	R-581, p. 135	Revised Project Description	"The capacity of the production line will be 48,000 tons per week, thus allowing flexibility in shipments to provide the required 2,000,000 tons."	Tons	Production
[15] November 2006	R-581, p. 137	Revised Project Description	"At the present time, Clayton does not anticipate a future demand in excess of two million metric tons a year from the White Point site."	Metric Tons	Production
[16] November 2006	R-581, p. 138	Revised Project Description	"There is sufficient rock on the Whites Point site to enable two million metric tons to be extracted for a fifty-year period."	Metric Tons	Production
[17] November 2006	R-581, p. 15	Revised Project Description	"These facilities require in excess of two million tons of construction aggregate per year."	Tons	Production
[18] November 2006	R-581, p. 19	Revised Project Description	"This means is considered to be the industry standard for this type of basalt to produce the proposed production of 2 million tons per year."	Tons	Production
[19] November 2006	R-581, p. 24	Revised Project Description	"The Whites Point quarry is a small, basalt rock quarry designed to produce 40,000 tons of aggregate per week and approximately 2 million tons per year over a 50 year project life."	Tons	Production
[20] November 2006	R-581, p. 6	Revised Project Description	"Annual production of aggregate products is estimated to be 2 million tons."	Tons	Production
[21] November 2006	R-581, p. 135	Revised Project Description	"The design annual production and shipment of all aggregates is 2,000,000 tons."	Tons	Production/Shipping
[22] November 2006	R-581, p. 96	Revised Project Description	"The operation of the quarry will require stationary equipment to process and load the projected 2 million tons of aggregate products per year."	Tons	Production/Shipping
[23] November 2006	R-581, p. 96	Revised Project Description	"Yearly production is estimated to be 2 million tons with weekly shipments of 40,000 tons."	Tons	Production/Shipping
[24] November 2006	R-581, p. 102	Revised Project Description	"Dead weight is approximately 70,018 tons with a gross tonnage of 41,428."	Tons	Shipping
[25] November 2006	R-581, p. 137	Revised Project Description	"However, initial investigations into the use of bulk carriers with up to 70,000 tons capacity have been carried out with the specific intent to reduce the number of ship trips per year."	Tons	Shipping
[26] November 2006	R-581, p. 137	Revised Project Description	"It should also be noted that while the Whites Point terminal has been designed to accommodate vessels carrying up to 70,000 tons of aggregate, the unloading ports presently contemplated are restricted due to water depths."	Tons	Shipping
[27] November 2006	R-581, p. 137	Revised Project Description	"The carrying capacity is approximately 45,000 tons."	Tons	Shipping
[28] November 2006	R-581, p. 40	Revised Project Description	"Approximately 40,000 tons is planned to be shipped each week for a total of 2 million tons per year."	Tons	Shipping
[29] November 2006	R-581, p. 6	Revised Project Description	"Water based infrastructure and activities will include the ship loading of approximately 40,000 tons of aggregate weekly."	Tons	Shipping
[30] June 2006	C-629, p. 366	Bilcon's Responses to Comments on the EIS - Vol II - Cover Page	"The Whites Point Quarry will have a capacity of 2 million tons per year at full capacity."	Tons	Production

Volume Unit References in Select Project Description Documents

Date	Exhibit & Page	Document Title	Excerpt	Units	Descriptive Category
[31] June 2006	C-629, p. 363	Bilcon's Responses to Comments on the EIS - Vol II - Cover Page	"The lifespan of the project is projected to be 50 years, with the annual production of 2 million tons being shipped to the United States for use by Bilcon's parent company Clayton Concrete, Block and Sand."	Tons	Production/Shipping
[32] 31 March 2006	R-579, p. 23	EIS, Volume VI	"The site contains in excess of 100 million tons of in-place stone which is ideally suited for quarrying and processing for the construction industry."	Tons	Reserves
[33] 31 March 2006	R-579, p. 24	EIS, Volume VI	"Quarrying will produce a site specific irretrievable loss of approximately 100 million tons of naturally occurring basalt rock and would result in a long term, insignificant negative effect, of local scale."	Tons	Reserves
[34] 31 March 2006	R-579, p. 24	EIS, Volume VI	"Quarrying will result in the removal of approximately 100 million tons of naturally occurring basalt rock over the 50 year life of the project, which will then be processed into a high quality, value added construction industry product."	Tons	Reserves
[35] 31 March 2006	R-580, p. 82	EIS, Volume VII	"High-quality basalt rock reserves are estimated to be in excess of 100 million tonnes within the active quarry area on the site."	Tonnes	Reserves
[36] 31 March 2006	R-575, p. 4	EIS, Volume I – Plain Language Summary	"Bilcon has leased 150 hectares of land and, at a production rate of 2 million tonnes per year, anticipates a quarry life of 50 years."	Tonnes	Production
[37] 31 March 2006	R-576, p. 82	EIS, Appendices, Volume III	"...Weekly production is proposed to be 40,000 tons."	Tons	Production
[38] 31 March 2006	R-577, p. 140	EIS, Volume IV	"A total thirty-four person workforce, working two shifts, will be required to produce the two million tons of aggregate per year."	Tons	Production
[39] 31 March 2006	R-577, p. 81	EIS, Volume IV	"Production is expected to reach 2 million tonnes of aggregate per year, or approximately 40,000 tonnes per week."	Tonnes	Production
[40] 31 March 2006	R-578, p. 10	EIS, Volume V	"This means is considered to be the industry standard for this type of basalt to produce the proposed production of 2 million tonnes per year."	Tonnes	Production
[41] 31 March 2006	R-578, p. 16	EIS, Volume V	"The Whites Point quarry is a small, basalt rock quarry designed to produce 40,000 tons of aggregate products per week and approximately 2 million tons per year over a 50 year project life."	Tons	Production
[42] 31 March 2006	R-578, p. 4	EIS, Volume V	"Annual production of aggregate products is estimated to be 2 million tons."	Tons	Production
[43] 31 March 2006	R-580, p. 174	EIS, Volume VII	"Clayton's requirement is for 2M tonnes per year and the capacity of the Whites Point Quarry operation has been designed to supply this quantity."	Tonnes	Production
[44] 31 March 2006	R-580, p. 194	EIS, Volume VII	"Annual design production for the project is 2.0 M tons per annum."	Tons	Production
[45] 31 March 2006	C-930, p. 16	EIS, Appendices, Volume I	"Quarrying is expected to take place on 120 hectares of land, with production expected to be 2 million tonnes of aggregate per year."	Tonnes	Production
[46] 31 March 2006	R-576, p. 56	EIS, Appendices, Volume III	"Approximately 2,000,000 tons of rock will be crushed and shipped per year."	Tons	Production/Shipping
[47] 31 March 2006	R-577, p. 26	EIS, Volume IV	"The lifespan of the project is projected to be 50 years, with the annual production of 2 million tonnes being shipped to the United States for use by the Proponent's parent company, Clayton Concrete Block and Sand."	Tonnes	Production/Shipping
[48] 31 March 2006	R-578, p. 44	EIS, Volume V	"The operation of the quarry will require stationary equipment to process and load the projected 2 million tons of aggregate products per year."	Tons	Production/Shipping

Volume Unit References in Select Project Description Documents

Date	Exhibit & Page	Document Title	Excerpt	Units	Descriptive Category
[49] 31 March 2006	R-578, p. 44	EIS, Volume V	"Yearly production is estimated to be 2 million tons with weekly shipments of 40,000 tons."	Tons	Production/Shipping
[50] 31 March 2006	R-580, p. 174	EIS, Volume VII	"The capacity of the shiploader is estimated to be 5,000 tonnes per hour and, theoretically, significantly more product could be loaded than the 2 M tonnes per year anticipated; however, while the shiploader has surplus capability, there is no additional space for stockpiling."	Tonnes	Production/Shipping
[51] 31 March 2006	C-930, p. 16	EIS, Appendices, Volume I	"Approximately 40,000 tonnes of aggregate would be produced for loading each week."	Tonnes	Shipping
[52] 31 March 2006	R-575, p. 4	EIS, Volume I – Plain Language Summary	"Shipment of crushed product is anticipated to be approximately 40,000 tonnes per week, though this will vary with ship availability and weather conditions."	Tonnes	Shipping
[53] 31 March 2006	R-577, p. 131	EIS, Volume IV	"To this end, Global Quarry Products made application for the installation of a marine terminal serving ships in excess of 25,000 Dead Weight Tonnes."	Tonnes	Shipping
[54] 31 March 2006	R-578, p. 31	EIS, Volume V	"Approximately 40,000 tons is planned to be shipped each week for a total of 2 million tons per year."	Tons	Shipping
[55] 31 March 2006	R-578, p. 4	EIS, Volume V	"Water based infrastructure and activities will include the ship loading of approximately 40,000 tons of aggregate weekly."	Tons	Shipping
[56] 31 March 2006	R-578, p. 49	EIS, Volume V	"Dead weight is approximately 70,018 tonnes with a gross tonnage of 41,428."	Tonnes	Shipping
[57] 31 March 2006	R-579, p. 208	EIS, Volume VI	"Vessels arriving and departing the Whites Point marine terminal are 'rule' vessels (vessels > 20 m (66 ft.) in length and > 300 gross registered tonnes (330 tons))."	Tons/Tonnes	Shipping
[58] 31 March 2006	R-580, p. 184	EIS, Volume VII	"Vessel size 50,000 tons."	Tons	Shipping
[59] 31 March 2006	R-580, p. 194	EIS, Volume VII	"A typical ship will be a 40,000 ton to 70,000 ton self-unloader."	Tons	Shipping
[60] 31 March 2006	R-580, p. 194	EIS, Volume VII	"With a 40,000 tonne capacity vessel, approximately 50 vessel transits are required per year."	Tonnes	Shipping
[61] 31 March 2006	R-580, p. 67	EIS, Volume VII	"Approximately 40,000 tons of product will be loaded into the holds of a bulk carrier similar to the Canadian Steamship Lines 'Spirit', a Panamax-class vessel."	Tons	Shipping